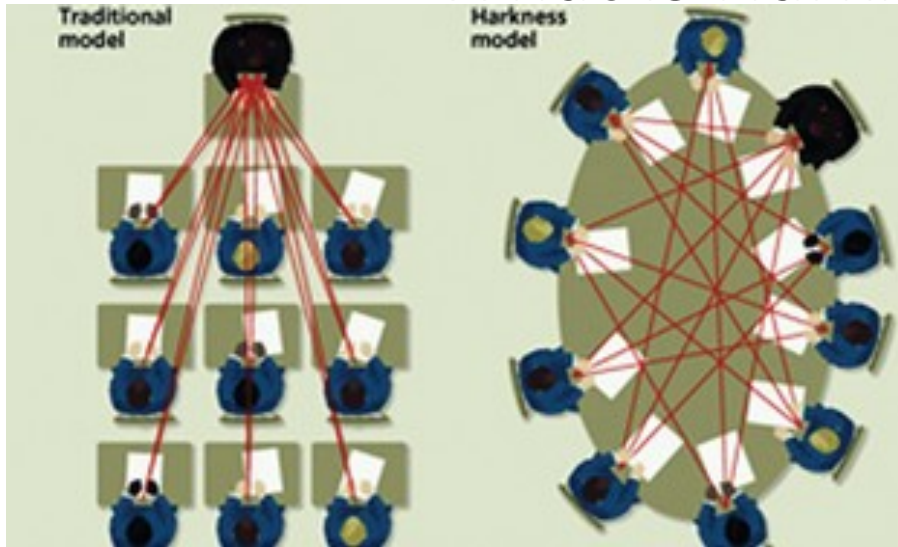




Flipping Squared: Discussion Based Teaching and Flipped Classroom

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What is Harkness Teaching?



<http://www.jpost.com/HttpHandlers/ShowImage.ashx?ID=149840>



https://www.exeter.edu/media/content/harkness_Flash_harkness3_rdx_422x294_75.jpg

- Developed and implemented at Phillips Exeter Academy, New Hampshire, USA
- Edward Harkness's gift: "What I have in mind is a classroom where students could sit around a table with a teacher who would talk with them and instruct them by a sort of tutorial or conference method, where each student would feel encouraged to speak up. This would be a real revolution in methods."

Our Initiative: A Short Glance

<https://www.youtube.com/watch?v=ZUZOlwJ2TqA>

What is Flipping the Classroom?

- In terms of Bloom's revised taxonomy (2001), this means that students are doing the lower levels of cognitive work (gaining knowledge and comprehension) outside of class, and focusing on the higher forms of cognitive work (application, analysis, synthesis, and/or evaluation) in class, where they have the support of their peers and instructor. This model contrasts from the traditional model in which "first exposure" occurs via lecture in class, with students assimilating knowledge through homework; thus the term "flipped classroom."

<http://cft.vanderbilt.edu/guides-sub-pages/flipping-the-classroom/>

Creating Videos and Integrating into the Classroom Discussion

- The videos provide the opportunity for the students to gain exposure to the topics prior to the class.
- How I create videos for my students:
Tablet with OneNote (or laptop with USB writing pad).
Screencast-o-matic (<http://www.screencast-o-matic.com/>)
and save as a MP4.
Post to my school's LMS via my YouTube Channel.
- Suggestions:
To ensure students have watched the videos, include questions that will be discussed at the next class, in various locations in the video.
Record your own videos so students hear your voice and you maintain ownership of the content and direction for the next class.

YouTube Playlist

- https://www.youtube.com/watch?v=mukkEfRLTeI&list=PLYFJ9RQgn1kHgJE0_kKKaqN8JDioF8Eja

Classroom Flow

- Students come to class prepared to discuss the current topic. (If you included a question in the video, they are prepared to discuss this question first)
- Questions are brought to the table that students had from watching the video and from trying questions prior to class.
- Students work on questions on the whiteboards or tablets in small groups.
- Once questions are completed (not necessarily correct), the whole group is brought back to the table for a summative discussion to formalize the process, offer suggestions to questions that are incomplete and/or assist students who struggled.

Video Lecture Demo

Video-lecture-demo.mp4

Pre-class Questions

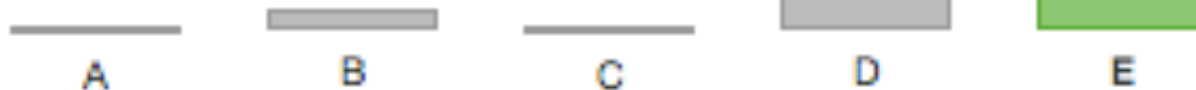
Question 1

1 pts

If $\lim_{x \rightarrow a} f(x) = 0$ and $\lim_{x \rightarrow a} g(x)$ does not exist then $\lim_{x \rightarrow a} f(x)g(x)$

- (A) is 1
- (B) is 0
- (C) is ∞
- (D) does not exist (and isn't ∞)
- (E) not enough information is given

- A
- B
- C
- D
- E



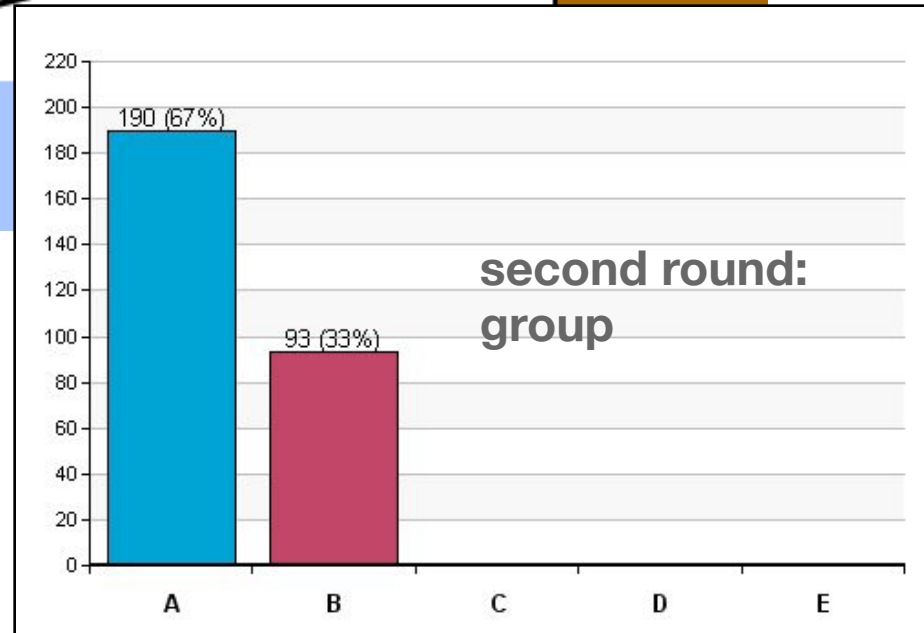
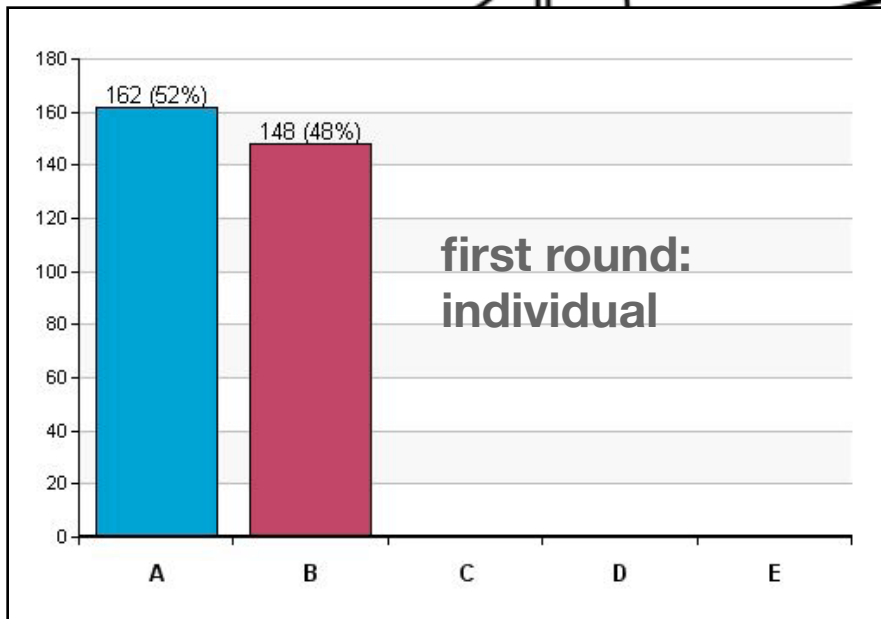
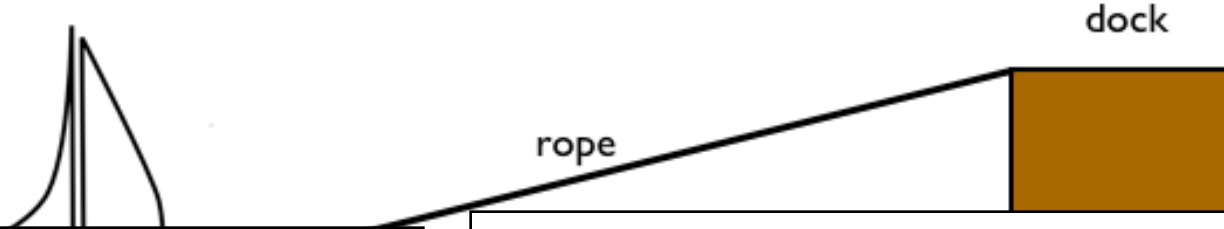
Inside the Classroom

151-class-observation.mp4

Inside the Classroom

A boat is drawn close to a dock by pulling in the rope at a constant rate.
True or False. The closer the boat gets to the dock, the faster it is moving.

- (A) True
- (B) False



Inside the Classroom

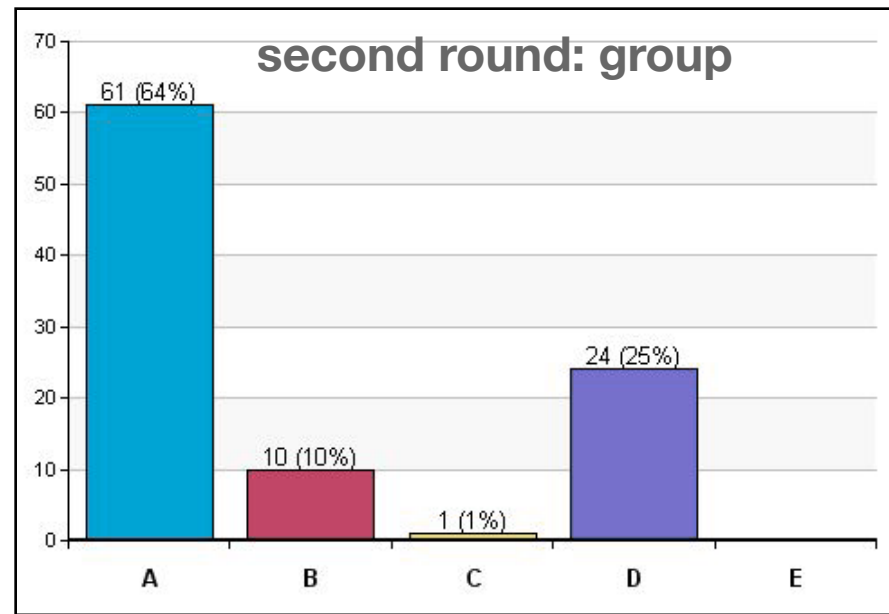
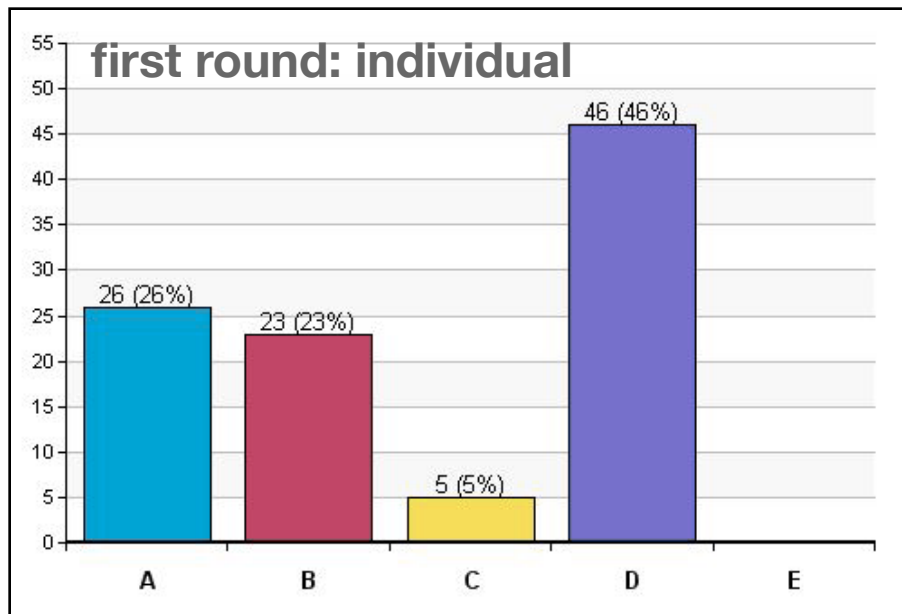
The derivative of $f(x) = x|x|$ at $x = 0$

(A) is 0.

(B) does not exist, because $|x|$ is not differentiable at $x = 0$

(C) does not exist, because f is defined piecewise

(D) does not exist, because the left and right hand limits do not agree.



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