

Keep it Active: Engaging Students in Virtual Classrooms

Electronic Seminar on Mathematics Education, April 7, 2020

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MINERVA® SCHOOLS AT KGI



Introductory Poll

What aspect of transitioning to a virtual classroom have you found most challenging?

- Maintaining student engagement throughout the session.
- Encouraging students to actively collaborate and communicate.
- Fostering a supportive learning environment online.
- Authentically connecting with students in a virtual classroom.

Seminar Goals

- **Brief Minerva overview**
- **Experience a Minerva class session**
- **Debrief the session**
- **Q&A**

Minerva Overview

- Liberal Arts program established in 2014
- Active learning seminars
- International student body
- Global, residential program

Global Rotation



Actively engaging students

Authentically engage each student throughout the session.

- Students are most engaged when actively working on a well defined task (e.g., polls, small breakout groups).
- Keep full-class discussions short, focused, and student-centered.
- Tasks should be well-defined and clearly tied to learning outcomes.

Stepping into our students' shoes

- You have just finished learning the basic concepts of derivatives of single variable functions.
- This is a first session on optimization.
- Before class you would have
 - Watched two short videos
 - Completed a short study guide.

Class is about to start...

Class Introduction

Unit: Differentiation and its Applications

Topic: Optimization I

- **Learning Outcome** - Apply the tools of differentiation and interpret the results.
- **Activity Learning Goal** - Solve optimization problems using derivatives.

Preparatory Assessment Poll

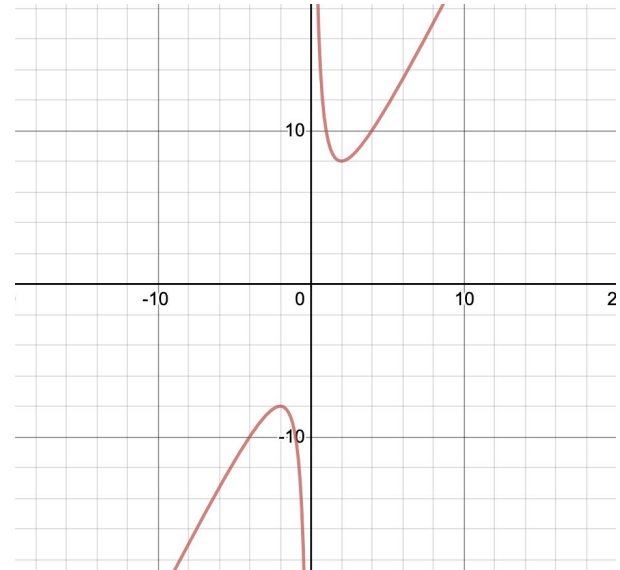
Review the solution of the following optimization problem: *Find and classify all critical points of the function $f(x) = 2x + 8/x$.* Select any steps that are incorrect or unclear.

- a. The critical points occur when $f'(x) = 0$ or does not exist.
- b. $f'(x) = 2 - 8/x^2 = 0$ when $x = -2, 2$, giving two critical points.
- c. $f''(x) = 8/x^3$. Thus $f''(-2) < 0$ and $f''(2) > 0$.
- d. This implies that $f(-2) = -8$ is a local minimum and $f(2) = 8$ is a local maximum.
- e. *All steps are correct and clear.*

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Breakout Instructions

Activity Learning Goal - Solve optimization problems using derivatives.

Instructions - There are two problems: a main problem and an enrichment problem. Complete as many as possible during the session. The group member with the first name in alphabetical order will be the group scribe today.

Problem Set Link - bit.ly/ESMEBreakoutNotes7Apr2020

Reflection Prompt

What is your top takeaway from this experience as a math student in a virtual classroom?

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Open Discussion

What questions do you have?

Additional Resources

- Boelkins, M. [OpenCalculus](#)
- [Academy of Inquiry Based Learning](#)
- Levitt, R., Tambasco, L., & Levitt, J. (2020, April 1). [Tips for Teaching Math \(and other STEM subjects\) Online](#) Medium. Minerva Schools.
- Minerva Faculty are hosting "Ask me Anything" sessions from April 7 to April 10 every weekday between 11-12pm (EST) and 5-6 pm (PT). [RSVP here.](#)

Thank you!