Module 4 Lab

Name: _____

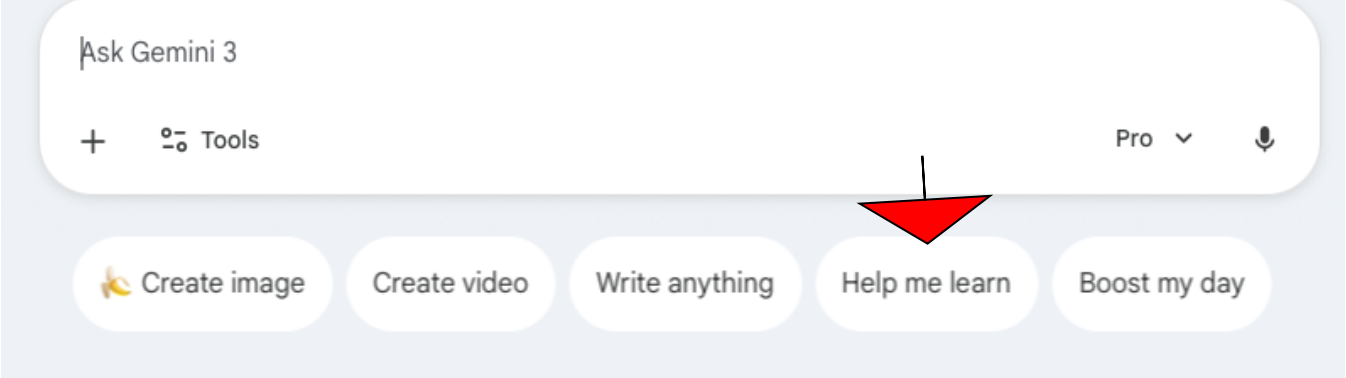
Substitution and Partial Fractions

Gemini Guided AI Learning for Integral Calculus

In this lab, you will utilize Google Gemini as a personalized tutor. You won't just solve problems; you will first "teach" the concept back to the AI to prove you understand the *why*, and then engage in a practice session.

How to Access Gemini

1. Go to gemini.google.com.
2. Make sure you are signed in with your PCC email account.
3. Click the "Help me Learn" button under the chat log.



4. *Note:* You are effectively programming the AI to be your specific tutor by using the exact prompts below.

Instructions

You will complete two "Chat Sessions." For each session, you must:

1. Copy and Paste the specific prompt provided below.
2. The Concept Check: The AI will explain the topic simply. You must then explain it back in your own words.
3. The Practice: Once the AI approves your explanation, it will give you problems. **Solve these on paper first (for proper notation)**, then check your answer with the AI.
4. For credit you need to submit the following for each part:
    - **The Chat:** Share your entire chat log. You can either click "Share" (top right) -> "Create Public Link" and paste the URL below, copy/paste your chat below, or take screenshots
    - **Your work:** your handwritten work for each of the practice problems with the correct notation.
    - **Reflection on the lab** - How did you like this way of doing a lab vs. using Khan academy practice? Can you see yourself using AI this way to *enhance* your learning

(instead of doing the learning for you) as you're learning new topics and studying for exams?

Part 1: Definite Integrals with U-Substitution

The Prompt: Copy and paste the text below exactly into Gemini.

> "I am a Calculus 2 student learning how to evaluate Definite Integrals using U-Substitution. Please act as my tutor and guide me through the following steps:
>
> Step 1: Explain with words AND images how and why u-substitution works. Do an example and show the graphs of both the x and the u so I can visualize what's happening and why this works.
>
> Step 2: Ask me to explain the concept back to you in my own words. Do not give me practice problems yet. Wait for my explanation.
>
> Step 3: Rate my explanation. If I missed something, help me refine it. Once my explanation is solid, move to Step 4.
>
> Step 4: Give me 3 practice problems, one at a time.
>
> - Vary the difficulty .
> - Wait for me to answer. Do not show the solution immediately.
> - If I get it wrong, help me figure out my error (ask about my 'u' choice). Then give me a new similar problem to try.
> - If I get it right, confirm it and move on to the next question."

Part 2: Integration with Partial Fractions

The Prompt: Copy and paste the text below exactly into Gemini.

> "I am a Calculus 2 student learning Integration by Partial Fractions. Please act as my tutor and guide me through the following steps:
>
> Step 1: Explain the logic of Partial Fractions like I'm in 5th grade.
>
> Step 2: Ask me to explain the concept back to you in my own words. Do not give me practice problems yet. Wait for my explanation.
>
> Step 3: Rate my explanation. If I missed something, help me refine it. Once my explanation is solid, move to Step 4.
>
> Step 4: Practice Give me 3 practice problems, one at a time.

- Only use functions with denominators that may be expressed as distinct linear factors.
- Wait for me to answer. Do not show the solution immediately.
- If I get it wrong, help me check my algebraic setup for A, B, etc. Then give me a new similar problem to try.
- If I get it right, confirm it and move on to the next question."

Submission & Grading

To receive credit, you must submit:

1. **The Chat:** Share your entire chat log. You can either click "Share" (top right) -> "Create Public Link" and paste the URL below, copy/paste your chat, or take screenshots
2. **Your work**: your handwritten work for each of the practice problems with the correct notation.
3. **Reflection on the lab** - How did you like this way of doing a lab vs. using Khan academy practice? Can you see yourself using AI this way to enhance your learning as you're learning new topics and studying for exams?

