

College of the Redwoods
Mathematics Department

Math 50B — Integral Calculus
Exam #1

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Quiz Questions

Read Carefully! You have until Monday (2/11/08) to complete the exam. The exam is due at the beginning of class on Monday (2/11/08). Late examzes are not accepted.

This exam is open notes, open book. This includes any supplementary texts or online documents. You must answer all of the exercises on your own. You are not allowed to work in groups or pairs on the exam. You are not allowed to enlist the aid of a tutor or friend to help with the exam. You are not allowed to read the exercises in the exam, then seek help on similar questions. Once you open the exam and read the questions, you may not seek any outside help of any kind.

I am not interested in reading pages and pages of calculations without accompanying narrative. It is essential that you include sound mathematical writing that both explains and justifies your solution or proof. Grammar and punctuation are important, as is the organization of your solution on the written page.

When working in the Mathlab or PS116, please do not work next to any other student who is also working on the exam. For the sake of propriety, please separate yourselves when working on the exam in these areas.

Place the solution to each exercise on a separate sheet of paper. On a good sheet of paper, write out (longhand) and sign the following honor pledge.

I promise that all work found herein is my own. I have received no help from tutors, colleagues, or other teachers. I also promise that I have refrained from sharing my work and ideas with other students in the class. I have also honored all of the exam constraints listed in the directions.

Arrange your solutions in order, place these exam page(s) on top of your solutions, then place the honor pledge on top of the exam as a cover sheet. Staple. Good luck!

EXERCISE 1. Find the area between the two curves defined by

$$y^2 = 4x \quad \text{and} \quad y = 2x - 4.$$

Please include a detailed sketch that shows the “fundamental strip(s).”

EXERCISE 2. Find the volume of the solid that results when the region enclosed by

$$x = y^2 \quad \text{and} \quad y = x$$

is revolved about the line $y = -1$. Use “fundamental strips” that are perpendicular to the axis of rotation. Please include a detailed sketch.

EXERCISE 3. Find the volume of the solid whose base is enclosed by the circle $x^2 + y^2 = 1$ and whose cross sections taken perpendicular to the base are squares. Please include a detailed sketch.

EXERCISE 4. Find the volume of the solid generated when the region enclosed by the curves

$$\frac{1}{x^2 + 1}, \quad x = 0, \quad x = 1, \quad \text{and} \quad y = 0$$

is rotated about the y -axis. Include a detailed sketch and use “fundamental strips” that are parallel to the axis of rotation.