University of California, San Diego
Department of Mathematics

Instructions

1. Write your *Name*, *PID*, *Section*, and *Exam Version* on the front of your Blue Book.
2. No calculators or other electronic devices are allowed during this exam.
3. You may use one page of notes, but no books or other assistance during this exam.
4. Read each question carefully, and answer each question completely.
5. Write your solutions clearly in your Blue Book.

    (a) Carefully indicate the number and letter of each question and question part.
    (b) Present your answers in the same order they appear in the exam.
    (c) Start each problem on a new page.

6. Show all of your work. No credit will be given for unsupported answers, even if correct.
7. Turn in your exam paper with your Blue Book.

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0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

1. (8 points) Find the area of the region enclosed by the curves $y = x^2 + 3x - 2$ and $y = 3x + 2$.

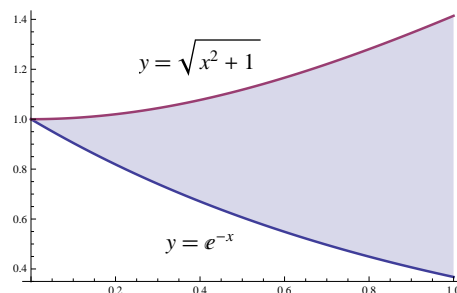2. Evaluate the following indefinite integrals:

    (a) (8 points) $\int \tan x \, dx$

    (b) (9 points) $\int \arctan x \, dx$

3. (8 points) Evaluate the definite integral:
$$\int_4^9 \frac{\sin \sqrt{x}}{\sqrt{x}} \, dx$$

4. (8 points) Let R be the region enclosed by the curves $y = \sqrt{x^2 + 1}$ and $y = e^{-x}$ between $x = 0$ and $x = 1$. (See figure below.) Compute the volume of the solid region obtained by rotating R about the x-axis.

5. (8 points) Find the volume of the solid with given base and cross sections: The base is the region enclosed by $y = x$ and $y = x^2$. The cross sections perpendicular to the y-axis are semicircles.

(This exam is worth 50 points.)