University of California, San Diego
Department of Mathematics

Instructions

1. **Write your *Name*, *PID*, and *Section* on the front of your Blue Book.**
2. **Write the *Version* of your exam on the front of your Blue Book.**
3. **No calculators or other electronic devices are allowed during this exam.**
4. **You may use one page of notes, but no books or other assistance during this exam.**
5. **Read each question carefully, and answer each question completely.**
6. **Write your solutions clearly in your Blue Book**
   (a) **Carefully indicate the number and letter of each question.**
   (b) **Present your answers in the same order they appear in the exam.**
   (c) **Start each question on a new page.**
7. **Show all of your work; no credit will be given for unsupported answers.**

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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:

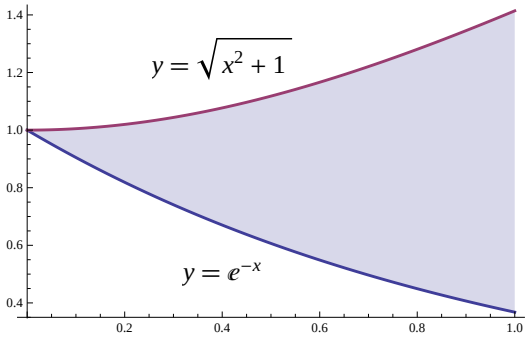
   (a) (8 points) $\int \tan x \, dx$

   (b) (10 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.)