



University of California, San Diego
Department of Mathematics

Instructions

1. Write your *Name*, *PID*, *Section Number* and the *Version* of your exam 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.
 - (b) Present your answers in the same order they appear in the exam.
 - (c) Start each question on a new page.
6. Show all of your work; no credit will be given for unsupported answers.

0. 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)

1. Use the Fundamental Theorem of Calculus to compute the following derivative: (5)

$$\frac{d}{dx} \int_0^{x^2+1} \sin(e^t) dt.$$

2. Evaluate the following indefinite integrals:

(a) $\int x e^{-2x} dx$ (9)

(b) $\int \frac{1}{(4-x^2)^{3/2}} dx$ (10)

3. Evaluate the following definite integral: (10)

$$\int_e^5 \frac{1}{x(\ln x)^2} dx.$$

4. Evaluate the indefinite integral. Use a partial fractions decomposition of the form $\frac{A}{x} + \frac{B}{x^2} + \frac{C}{x-1}$. (10)

$$\int \frac{x+1}{x^2(x-1)} dx$$

5. Compute the following improper integral: (5)

$$\int_2^5 \frac{1}{\sqrt{x-2}} dx$$

(This exam is worth 50 points.)