



*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. (7 points) Find all solutions to  $z^5 = -5$ . You may leave your answers in polar form.

2. (8 points) Evaluate the indefinite integral:

$$\int \frac{2x + 3}{x^2(x^2 + 1)} dx.$$

3. (8 points) Evaluate the indefinite integral:

$$\int \frac{1}{(4x^2 + 25)^2} dx.$$

4. (8 points) Evaluate the improper integral and determine if it converges or diverges:

$$\int_{-\infty}^0 xe^{-x^2} dx$$

5. (8 points) Determine if the improper integral converges. You do not need to evaluate it, but you must explain how you know it converges or diverges:

$$\int_0^{\infty} e^{-(3x^2+2x+1)} dx$$

(This exam is worth 40 points.)