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.**

DO NOT TURN OVER UNTIL INSTRUCTED TO DO SO

Question Zero:

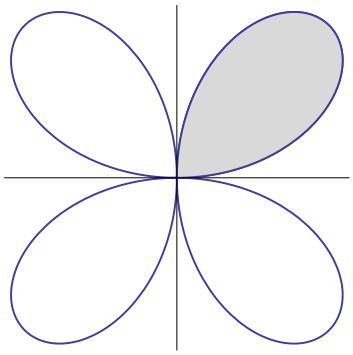
0. (1 point) Carefully read and complete the instructions at the top of this exam sheet and any additional instructions written on the chalkboard during the exam.

(This exam is worth 40 points.)

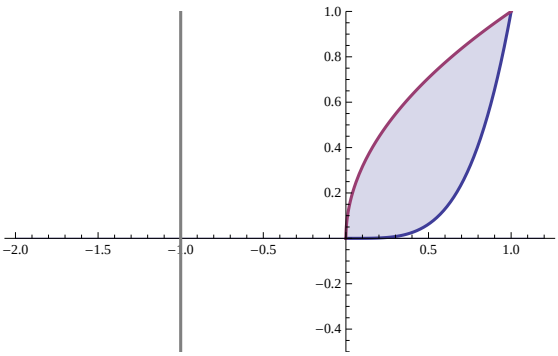
1. (8 points) Compute the indefinite integral:

$$\int \sqrt[3]{x}\ln(5x)\,dx$$

2. (7 points) Compute the area of the shaded region, which is one petal of the "polar rose" given by the equation $r = 5\sin(2\theta)$.



3. (8 points) The shaded region is enclosed by the curves $y = x^4$ and $y = x^{1/2}$. Set up (but do not evaluate) an integral that will give the volume of the solid object obtained by rotating the shaded region about the axis $x = -1$. **Do not evaluate the integral.**



4. (8 points) Compute the indefinite integral:

$$\int \frac{\arctan(\ln x)}{x}\,dx$$

5. (8 points) Compute the area under the curve $y = e^{\sqrt{x}}$ over the interval $[0, 4]$.