

**Math 174 02,
the course of Dr. Mihailovs**

Midterm 3

November 20, 1998

Name _____

Problem	1	2	3	4	5	6	7	8	9	Extra	Total
Points											

1. Find the area of the surface obtained by rotating the curve $y = 3\sqrt{x} + 1/(2\sqrt{x})$ from 1 to 4 about the x -axis.

2. Find the Cartesian equation of the curve $x = 3 \cos t$, $y = 2 \sin t$.

3. Find the equation of the tangent to the curve $x = t^2 + 1$, $y = 2t \sin t$
at $t = 0$.

4. Find the area of the region bounded by the curve in Problem 2.

5. Find the length of Cornu's spiral $x = \int_0^t \cos \frac{\pi u^2}{2} du$, $y = \int_0^t \sin \frac{\pi u^2}{2} du$ from $t = 0$ to $t = 2$.

6. Find the area inside the circle $r = 2$ and outside the cardioid $r = 2 - 2\sin\theta$.

7. Find the eccentricity, identify the conic, give an equation of the directrix and sketch the conic $r = \frac{3}{2+3\cos\theta}$.

8. Find $\sum_{k=1}^{\infty} \frac{a_k}{k(2k+1)}$ where $a_k = \sum_{n=0}^{\infty} \frac{1}{(2k)^n}$.

9. Test the series $\sum_{n=2}^{\infty} \frac{1}{n \ln^2 n}$ for convergence or divergence.