

MATH 222, Lec. 3, EXAM #3

YOUR NAME

T.A.'s NAME

Show all your work. No calculators or references.

1.(20 points)
2.(20 points)
3.(20 points)
4.(20 points)
5.(20 points)
Total

1. Find the solution to the following two initial value problems:

(a) $(1 + x^2) Y' + 2xY = 3\sqrt{x}$, $Y(0) = 2$

(b) $Y'' + Y = x^2 + 2e^x$, $Y(0) = 0$, $Y'(0) = 0$

- 3
2. Find the general solution of $Y'' + 4Y = \sec(2x)$ on the interval $-\pi/4 < x < \pi/4$.

- 4
3. Sketch the following two curves and find the Cartesian coordinates of their vertices: (a) $r = 3/(1 + \cos(\theta))$ and (b) $r = 2/(1 + 2 \sin(\theta))$.

4. Find the Cartesian coordinates of all the points of intersection of the two curves $r = 1$ and $r^2 = 2\cos(\theta)$.

- 6
5. (a) Find the area inside $r = 2\sin(\theta)$ and outside $r = 1$.
(b) Find the length of the curve $r = e^{-\theta}$ for $0 \leq \theta \leq 2\pi$.