MATH 1272 SAMPLE MIDTERM II PROBLEMS

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INSTRUCTOR: Anar Akhmedov

The midterm exam will cover the Sections 8.1 - 8.3, 9.1 - 9.5, 10.1 - 10.5

1. Determine the lenght of the curve $x = y^2/2$ for $0 \leq x \leq 1/2$. Assume that $y \geq 0$.

2. Find the surface area of the torus (the donut-shape) with radii r and R (Exercise 30, Section 8.2).

3. Determine the center of mass for the region bounded by $y = x^3$ and $y = \sqrt{x}$.

4. Find the orthogonal trajectories of the family of curves $y = \dfrac{k}{x}$. Draw several members of each family.

5. Solve the initial-value problem
$$(x^2 + 1)\frac{dy}{dx} + 3x(y - 1) = 0, \ y(0) = 2.$$

6. Sketch the curve $r = 2 + 4cos(\theta)$. Determine the area of the inner loop of $r = 2 + 4cos(\theta)$.

7. Find the exact lenght of the polar curve $r = \theta^2$, $0 \leq \theta \leq 2\pi$