Math 1710.008

Sample Test 3

Read questions carefully and answer. Show work for partial credit.

1. Find the volume of the solid that lies between planes perpendicular to the x-axis at $x = -\pi/3$ and $x = \pi/3$, and the cross-sections perpendicular to x-axis are circular disks with diameters running from the curve y = tanx to the curve y = secx.

2. Find the lengths of the curve: x = cost, y = t + sint and $0 \le t \le \pi$.

3. Find the area enclosed by the parabola $y = 2 - x^2$ and the line y = -x.

4. Find $\frac{dy}{dx}$ of the function $y = \int_0^{x^2} \cos\sqrt{t} dt$

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

6. Solve:
a)
$$\int \frac{1}{x^2} \sin \frac{1}{x} \cos \frac{1}{x} dx$$

b)
$$\int x^{1/3} \sin\left(x^{4/3} - 8\right) dx$$

c) $\int \sin^2 \frac{x}{4} dx$

d)
$$\int_{-1}^{1} \frac{x^3}{\sqrt{x^4+9}} dx$$