Math 142 | Exam 2 | Name _____
No Work-No Credit | Summer 1999 | SSN _____

Round all values used in calculations to two decimal places!!

Determine the area of the region bounded by $f(x) = x^2$ *and* $g(x) = tan^{-1}x$.

(20) 1. $\int_0^{0.83} (tan^{-1}x - x^2)\,dx \approx 0.12$

The linear density of a piece of rope 8m long is $\frac{12}{\sqrt{x+1}}\frac{kg}{m}$, where x is measured in meters from one end of the rope. Find the average density of the rope.

(10) 2. $f_{avg} = \frac{1}{8-0}\int_0^8 \frac{12}{\sqrt{x+1}}\,dx = 6$

Revolve the region determined by y = cos x, y = tan x and the y-axis about the y-axis and determine the volume of the solid formed.

(20) 3. $\int_0^{0.67} 2\pi x(\cos x - \tan x)\,dx \approx 0.56$

Revolve the region in problem 3 about the x-axis and determine the volume of the solid formed.

(20) 4. $\int_0^{0.67} \pi(\cos^2 x - \tan^2 x) \approx 1.43$

Find the length of one bump of the curve $y = \sqrt{1 + \sin x}$.
(For credit, you must set up the integral correctly!!)

(10) 5. $\int_{\frac{-\pi}{2}}^{\frac{3\pi}{2}} \sqrt{\frac{5}{4} - \frac{1}{4}\sin x}\, dx \approx 7.01$

A steel drum (standing upright) 2 m in height and 1 m in diameter is half filled with a liquid of density ρ. Determine the work required to pump the liquid out over the top of the drum. (Leave your answer in terms of ρ.)

(20) 6. $W = \rho \int_0^1 (9.8)(0.25\pi)(2 - y)\, dy \approx 11.55\rho$ Nm