H.W. 7

Due Monday Mar. 9th

<u>Improper Integrals:</u>

For $p > 0$, what can be said about the following improper integrals? That is, for each one does it diverge to $+/- \infty$ or does it converge to a number? If it converges give the value in terms of p. (Hint: The cases $p < 1$, $p = 1$ and $p > 1$ are all different in some way)

(i)

$$\int_1^\infty \frac{1}{x^p} \, dx$$

(ii)

$$\int_0^1 \frac{1}{x^p} \, dx$$

Arclength:

Find the arclength of the cardioid. That is, the curve parameterized by

$$t \mapsto \Big(\cos(t)(1 - \cos(t)), \ \sin(t)(1 - \cos(t)) \Big)$$

on the interval $[0, 2\pi]$

<u>Surface Areas of Revolution:</u>

Find the surface area of a sphere of radius r by finding a way to create the surface of this sphere by rotating some graph about an axis. Then use the surface of revolution surface area formula.