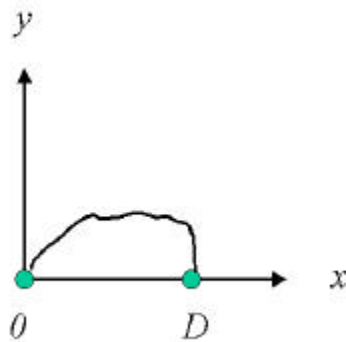


September 8, 1999

**PHY 337– Problem Set # 4**

This problem is due Monday 9/6/99 and will be worth 40 points.



Consider a curve such as the one shown above which passes through the points  $(x, y) = (0, 0)$  and  $(x, y) = (D, 0)$ .

1. Find the equation for the curve  $y(x)$  which satisfies the two conditions:

(a) Maximizes the area:

$$A = \int_0^D y \, dx$$

(b) Constrains the length of the curve:

$$L \equiv \int_0^D \sqrt{1 + \left(\frac{dy}{dx}\right)^2} \, dx = \frac{\pi D}{2}.$$

2. Carry out the integrals for  $A$  and  $L$  for your curve  $y(x)$ .