September 8, 1999

PHY 337– Problem Set # 3

Continue reading Chapter 6 of **Marion**.

1. Consider the Brachistochrone problem where the particle starts out from the point $(x_1, y_1) = (0, 0)$ and travels along a frictionless track under the force of gravity to the point $(x_2, y_2) = (h\frac{\pi}{2}, -h)$. Evaluate the travel time for

   (a) The extremal path described by the perimetric equations:

   $$x(\theta) = \frac{h}{2}(\theta - \sin(\theta)) \quad \text{and} \quad y(\theta) = -\frac{h}{2}(1 - cos(\theta)). \tag{1}$$

   (b) A straight line path:

   $$y(x) = -\frac{2}{\pi}x. \tag{2}$$