PHYC 3590 - Advanced Classical Mechanics Assignment 4

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The questions for this assignment are 6.1, 6.3, 6.4, 6.5.

1 Question 6.1

Use spherical polar coordinates (r, θ, ϕ) to show that the length of a path joining two points on a sphere of radius R is

$$L = R \int_{\theta_1}^{\theta_2} \sqrt{1 + \sin^2\theta \phi'(\theta)^2} d\theta \tag{1}$$

$$L = \int_1^2 ds \tag{2}$$

$$s = r\sin(\theta)\phi \tag{3}$$