UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Department of Physics

Physics 105A   Winter 2012

Prof. Gary Horowitz   TA William Kelly

ASSIGNMENT #1

Due by Friday, January 13 at 5pm in box on first floor of Broida

1) Taylor, problem 1.19.

2) Taylor, problem 1.39. Hint: For the last part, it is useful to use the half angle formulas

$$\cos(\alpha/2) = \sqrt{\frac{1 + \cos\alpha}{2}}, \qquad \sin(\alpha/2) = \sqrt{\frac{1 - \cos\alpha}{2}}$$

3) A projectile of mass m is fired from the origin with velocity $\mathbf{v} = (v_{ox}, v_{oy})$ at time $t = 0$. At the same time, a target of mass M is released from rest at the point (X_0, Y_0). Assuming a (uniform) gravitational force in the y direction and neglecting air resistance, at what angle θ should the projectile be aimed to hit the target?