Phys 410
Spring 2013, Prof. Anlage
8 February, 2013

Problem 1. Consider a small frictionless puck perched on the top of a fixed sphere of radius R. If the puck is given a tiny nudge so that it begins to slide down, through what vertical height will it descend before it leaves the surface of the sphere?

Hint: Use conservation of energy to find the puck's speed as a function of height, then use Newton's second law to find the normal force of the sphere on the puck. At what value of this normal force does the puck leave the sphere?

Problem 2

Is the following force conservative?

$F_x = ayz + bx + c$

$F_y = axz + bz$

$F_z = axy + by$

where a, b, c are constants.

Is the following force conservative?

$F_x = -ze^{-x}$

$F_y = \ln z$

$F_z = e^{-x} + y/z$