

Physics 141

Quiz 3

Tuesday, Nov. 4, 2008 (Election Day!!)

Name:

=====
Problem 1 of 1 (Recommended time ≤ 15 minutes)

Consider a 2-dimensional vector field that describes a force \vec{F} acting on a small object of mass m , where $\vec{F} = -y^2\hat{x} + x^2\hat{y}$.

a) Explicitly calculate (i.e. do the path integral) how much work is done pushing the mass counter-clockwise around a rectangular path for which the corners are $(x, y) = (0,0)$, $(w,0)$, (w,h) , and $(0,h)$? (Assume it's done slowly, so ignore the kinetic energy given to the mass).

b) Now let us suppose that in addition to the force field F , the block is subjected to a frictional force as it slides on a surface around that path. If the coefficient of friction is μ , how much work due to friction is done pushing the block around the above path?