Work and Energy
PHYS 2425

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1. Conceptual Questions

Refer to last week's conceptual questions.

2. Work and Energy Problems

Note: Work through problem 2 from last week.

1. A block of mass m is sliding on a frictionless plane with some velocity v. It then encounters a spring with spring constant k. The block compresses the spring, and rebounds the other direction. How much does the spring get compressed by? If the block eventually runs into a frictionless ramp, how far along the ramp will it travel before it's velocity is 0? The ramp makes the angle θ with the horizontal.

The entire kinetic energy becomes spring energy. If the KE is $\frac{1}{2}mv^2$ and the spring energy is $\frac{1}{2}kx_{max}^2$, then the compression distance becomes $v\sqrt{\frac{m}{k}}$.

After rebounding, the block has the same amount of kinetic energy, just in the opposite direction. So when it hits the ramp, all of the original kinetic energy will become converted to potential energy. We can use this to solve for the height of the block: $h = \frac{v^2}{2g}$. We can then use trig to solve the the distance it travels: $L = \frac{h}{\sin \theta}$.