1. A block of mass $m = 5\text{ kg}$ is released from rest at the top of an incline which makes an angle $\theta = 30^\circ$ with the horizontal. The coefficient of sliding friction between the block and the plane is $\mu_k = 0.2$.

After the block has traveled $d = 2\text{ m}$ down the incline,

a) How much work has been done by the gravitational force acting on the block? (3 points)

b) How much work has been done by the normal force acting on the block? (2 points)

c) How much work has been done by the friction force acting on the block? (3 points)

d) What is the speed of the block? (2 points)

Rewrite and sign the Honor Pledge: *I pledge my honor that I have not violated the Honor Code during this examination.*

Signature

(OVER)
2. A mass, $m$, is placed on a vertically oriented massless spring with spring constant, $k$, and pushed down until the spring has been compressed a distance $x$ from its natural length. The mass is released and flies off the spring in a vertical trajectory.

![Diagram](image)

a) Ignoring air drag, how high does the mass go? (State the height, $h$, as the distance above the point where the spring was compressed by $x$.) (5 points)

b) At the point when the spring had returned to its natural length (and the mass was still in contact with the spring), how fast was the mass moving? (5 points)