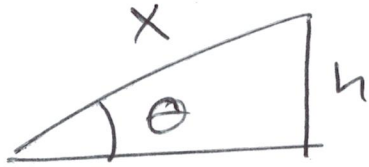


Homework #1

#1



$$h = x \sin \theta$$

$$x = h / \sin \theta$$



$$F = ma = mg \sin \theta$$

$$2ax = v^2$$

$$v^2 = 2g \sin \theta \frac{h}{\sin \theta}$$

$$v = \sqrt{2gh}$$

#2

$$\frac{1}{2} m v^2 = mgh \Rightarrow$$

\Rightarrow

$$v^2 = 2gh$$

$$v = \sqrt{2gh}$$

#3

$$L = T - V$$

$$T = \frac{1}{2} m \dot{x}^2$$

$$V = mgx \sin \theta$$

$$\frac{\partial L}{\partial \dot{x}} = m \dot{x}$$

$$\frac{\partial L}{\partial x} = mg \sin \theta$$

$$\Rightarrow m \dot{x} - mg \sin \theta = 0$$

$$\Rightarrow \ddot{x} = a = g \sin \theta$$

$$\Rightarrow v^2 = 2ax$$

$$= 2g \sin \theta \frac{h}{\sin \theta}$$

$$v^2 = 2gh$$

$$v = \sqrt{2gh}$$