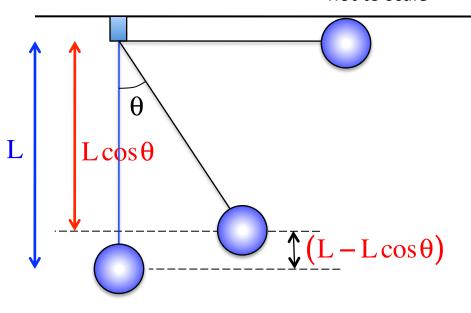# Problem 7.42

Consider the system to the right:

a.) Determine the gravitational potential energy when at the top, assuming its zero level is at the lowest point of the arc (i.e., that's where y = 0):

$$U_g = (mg)y$$
$$= (400.\ N)(2.00\ m)$$
$$= 800.\ J$$

b.) Determine the gravitational potential energy when the body is at $\theta = 30°$:

$$U_g = (mg)(L - L\cos\theta)$$
$$= (400.\ N)\left[(2.00\ m) - (2.00\ m)\cos 30°\right]$$
$$= 107\ J$$

c.) Determine the gravitational potential energy at the bottom of the arc:

The *zero-potential energy level* was defined at the bottom of the arc.

L

$L\cos\theta$

θ

$(L - L\cos\theta)$