9)

Trish Dho

Bobby:

$E_i = E_f$

$\cancel{K_i}^{0} + U_i = K_f + \cancel{U_f}^{0}$

$mgh = \frac{1}{2}mv^2$

$2gh = v^2$

$v^2 = 2(10)(220-27)$

$v^2 = 38.6$

Rhoda

$E_i = E_f$

$\cancel{K_i}^{0} + U_i = K_f + \cancel{U_f}^{0}$

$mgh = \frac{1}{2}mv^2$

$h = \frac{1}{2}\frac{v^2}{g}$

$h = \frac{38.6}{2(10)} = 1.93\,cm$

Rhoda should compress the spring 1.93cm to hit the center of the box.

10) a) $F = ma$

$I = I\alpha$ $\quad I = \frac{1}{2}mR^2$ $\quad \alpha = \frac{a}{R}$

$Fg - T = ma$

$mg\sin\theta - \frac{I}{R^2}a = ma$

$g\sin\theta - \frac{I}{mR^2}a = a$