9) $\Delta x = 2.2$ Δx actual =

Spring =

$\Delta x = .011\ m$

Bobby:

$\Delta x = .011$

$\Delta y = ?$

$\frac{1}{2}K(\Delta x)^2 + mgh = \frac{1}{2}mv_f^2$

$v_{fx} = v_{ix}$

$(2.2 - .27) = vt$

$1.93 = vt$

$\frac{1.93}{v_i} = t \qquad v = \frac{1.93}{t}$

$\Delta y = \frac{1}{2}a\Delta t^2$

$\Delta y = -\frac{9.8}{2}t^2$

$\frac{1}{2}K(.011)^2 + mg\left(\frac{9.8}{2}t^2\right) = \frac{1}{2}mv^2$

$\frac{1}{2}K(.011)^2 + mg\left(\frac{9.8}{2}t^2\right) = \frac{1}{2}m\left(\frac{1.93}{t}\right)^2$

$\frac{1}{2}K(.011)^2 = \frac{1}{2}m\frac{3.725}{t^2} - mg(4.9t^2)$

Rhonda

$\frac{1}{2}K(\underline{\underline{\Delta x}})^2 + mgh =$

K

$v_{ix} = \Delta x \, t$

$v_{ix} = (2.2 - .27)\Delta t$

$\frac{v_i}{1.93} = \Delta t$

$\Delta y = -\frac{9.8}{2}\Delta t^2$

$\Delta y = -\frac{9.8}{2}\left(\frac{v_i}{1.93}\right)^2$

Δy is going to be $\ominus$

$\Delta y = 1.315v^2$

$\frac{1}{2}k(\Delta x)^2 + mgh = \frac{1}{2}mv_f^2$

$\frac{1}{2}k(.011)^2 + mg(1.315v^2) = \frac{1}{2}mv^2$

Bobby

$v = \sqrt{\frac{h}{1.315}}$

$\frac{1}{2}k(.011)^2 + mgh = \frac{1}{2}m\frac{h}{1.315}$

Rhonda

$\frac{1}{2}k(\Delta x)^2 + mgh = \frac{1}{2}mv_f^2$

$v_f = \Delta x \, t$

$v_f = 2.2t$

$\Delta t = \frac{v_f}{2.2}$

$h = \frac{9.8}{2}\Delta t^2$

$h = \frac{9.8}{2}\left(\frac{v_f}{2.2}\right)^2$

$$h = 1.0124 v_f^2$$

$$v_f = \sqrt{\frac{h}{1.0124}}$$

Rhonda

$$\frac{1}{2} K (\Delta x)^2 + mgh = \frac{1}{2} m \frac{h}{1.0124}$$

same K and same h

$$\frac{1}{2} K (.011)^2 + mgh = \frac{1}{2} m \frac{h}{1.315}$$

$v_{ix} = v_{fx}$

v_{ix} = velocity released at

$2.2 - .27 = 1.93$

$1.93 = v_i (\Delta t)$

$h = \frac{9.8}{2} t^2$ $\qquad t = \sqrt{\frac{2h}{9.8}}$ $\qquad v_i = \frac{1.93}{\sqrt{\frac{2h}{9.8}}}$

$h = \frac{9.8}{2} \left(\frac{1.93}{v_{ib}} \right)^2$ Bobby

$h = \frac{9.8}{2} \left(\frac{2.2}{v_{ir}} \right)^2$ Rhonda

$\frac{1}{2} K (.011)^2 + mgh$

Bobby

$$\frac{1}{2} K (.011)^2 + mgh = \frac{1}{2} m \left(\frac{1.93^2}{\frac{2h}{9.8}} \right)$$

$$\frac{1}{2} K (.011)^2 + mgh = \frac{18.252}{h} m$$

Rhonda

$$\frac{1}{2} K (\Delta x)^2 + mgh = \frac{2.2}{\frac{2h}{9.8}} \left(\frac{1}{2} m \right)$$

$$\frac{1}{2}K(\Delta x)^2 + mgh = \frac{23.716}{h}m$$

K is going to be equal,
m is equal, h is equal

$$\frac{1}{2}K(.011)^2 + mgh = \frac{1}{2}mv_f^2$$

Rhonda will have to compress the spring more

$$\frac{1}{2}K(\Delta x)^2 + mgh = \frac{1}{2}mv_f^2$$

$2.2 = v_{ix}\Delta t$

$h = \frac{9.8}{2}\Delta t^2$

$h = \frac{9.8}{2}\left(\frac{2.2}{v_R}\right)^2$ Rhonda

$h = \frac{9.8}{2}\left(\frac{1.93}{v_B}\right)^2$

$1.93 = v_B t$

$h = \frac{9.8}{2}(t)^2$

$h = \frac{9.8}{2}$

$$\frac{1}{2}K(.011)^2 + mgh = \frac{18.252}{h}m$$

$$\frac{1}{2}K(\Delta x)^2 + mgh = \frac{23.716}{h}m$$

$$\frac{\frac{18.252\,m}{h} - mgh}{(.011)^2} = \frac{\frac{23.716\,m}{h} - mgh}{\Delta x^2}$$