1) when $x = 0.011m$, $d = 1.93$

Mechanical energy is conserved, therefore:

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

So we have: $I_2 = \frac{D}{D_1} I_1$

Where I_1 is the compression of the spring on the first slot and I_2 is the compression of the string on the second slot.

$$I_2 = \frac{D}{D_1} I_1 = \left(\frac{2.1m}{1.93m}\right)(0.011m) = 0.12538\,m$$
$$= 1.259\,cm$$

Rhoden should compress the string $\boxed{1.259\,cm}$

2) $R = 0.2m$
$m = 2\,kg$
$g = 10\,\frac{m}{s^2}$
$I = \frac{1}{2}MR^2$

8