

cart 2

$$1) \quad \frac{1}{2} k x_i^2 = m g h_2$$

↓   ↓   ↓   ↓  
561   (.12)<sup>2</sup>   ?   1.38

$$m = \frac{k x_i^2}{2 g h_2} = \frac{(561)(.12)^2}{(2)(9.8)(1.38)} = .2987 \text{ kg}$$

$$2) \quad \frac{1}{2} k x_i^2 = \frac{1}{2} m v_f^2 + m g h_f$$

↑   ↑   ↑   ↑  
572   ?   3.03   2.1   2.45  
kg   m/s   m

$$x_i^2 = \frac{m}{k} v_f^2 + \frac{2(3.03)(2.45)(9.8)}{k}$$

$$x_i^2 = \frac{3.03}{572} (2.1)^2 + \frac{2(3.03)(2.45)(9.8)}{572}$$

$$= .2777 \Rightarrow \boxed{x_i = .527 \text{ m}}$$

$$3) \quad \frac{1}{2} m v_i^2 = m g h + \frac{1}{2} m v_f^2$$

CANCEL m = mass   ↑ ?

$$v_i^2 = 2 g h + v_f^2$$

↑ want

$$\boxed{v_f^2 = v_i^2 - 2 g h} \quad v_f = \sqrt{\frac{4.9^2 - 2(9.8)(1.14)}{1}} = \boxed{1.29 \frac{\text{m}}{\text{s}}}$$

Error due to round-off bug in code.