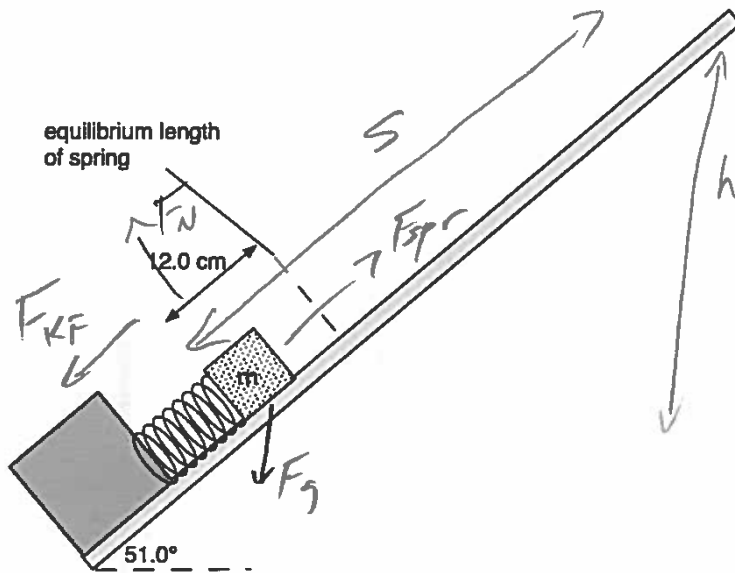


**Physics 10154 - Quiz 10C**

0.450

A ~~1.00~~ 1.00-kg mass is initially at rest against a spring ( $k_s = 622 \text{ N/m}$ ) on an rough inclined plane tilted  $51.0^\circ$  above the horizontal. The coefficient of kinetic friction between the block and the plane is 0.218. The mass is released from rest and slides up the ramp for some distance ( $s$ ) along the ramp before coming to a stop. What is the distance moved along the ramp from its starting point (so your distance will also include the 12.0 cm of spring compression)? The length of the ramp is not necessarily drawn to scale.



$$h = s(\sin 51^\circ)$$

$$K_i = 0 \text{ (initial)}$$

$$K_f = 0 \text{ (at max } s)$$

$$\Sigma W_F = W_g + W_N + W_{spr} + W_{KF} = \Delta K$$

$$W_g = -mgs(\sin 51^\circ) = -3.427s$$

$$W_N = 0$$

$$W_{spr} = +\frac{1}{2}k_s \Delta x^2 = +4.4784$$

$$W_{KF} = \mu_k F_N(s) \cos 180^\circ$$

$$= -\mu_k (mg \cos 51^\circ) s = -0.605s$$

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$$-3.427s + 4.4784 - 0.605s = 0$$

$$s = \frac{4.4784}{4.032} = \boxed{1.11 \text{ m}}$$