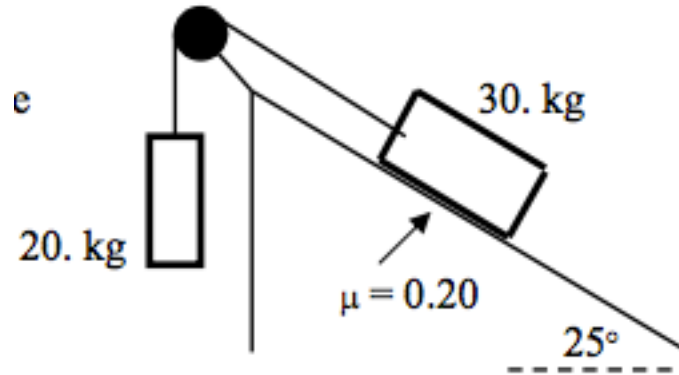


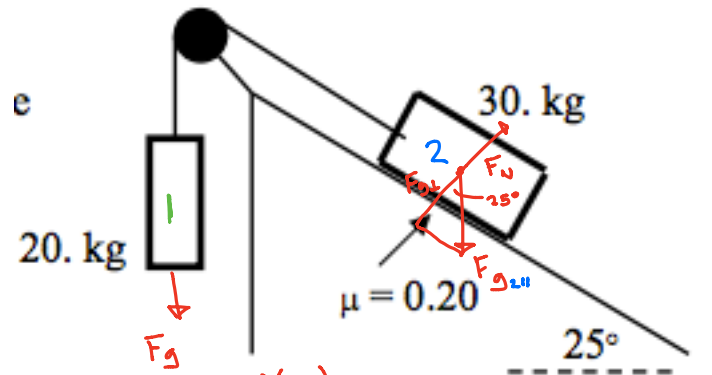
### Quiz 4c

Examine the system below. Determine the acceleration of the system and the distance the 20.0 kg block will fall in 2.0 s starting from rest.



ANSWER:

Examine the system below. Determine the acceleration of the system and the distance the 20.0 kg block will fall in 2.0 s starting from rest.



$$F_g = mg = (20.)(9.8) \\ F_g = 196 \text{ N}$$

$$F_{\text{net}} = F_{g1} - F_{g2 \parallel} - F_f \checkmark$$

$$F_N = F_{g \perp}$$

$$F_N = (30.)(9.8) \cos(25) = 266 \text{ N}$$

$$F_f = \mu F_N = (0.20)(266 \text{ N}) = 53 \text{ N} \checkmark$$

$$F_{g \parallel} = mg \cdot \sin(25) = (30.)(9.8) \sin(25) = 124 \text{ N} \checkmark$$

$$F_{\text{net}} = F_{g1} - F_{g2 \parallel} - F_f = 196 \text{ N} - 124 \text{ N} - 53 \text{ N} = 18 \text{ N}$$

$$a = \frac{F_{\text{net}}}{m_{\text{total}}} = \frac{18 \text{ N}}{50. \text{ kg}} = 0.37 \text{ m/s}^2 \checkmark$$

$$d = v_0 t + \frac{1}{2} a t^2 = \frac{1}{2} (0.37) (2.0)^2 = 0.74 \text{ m} \checkmark$$