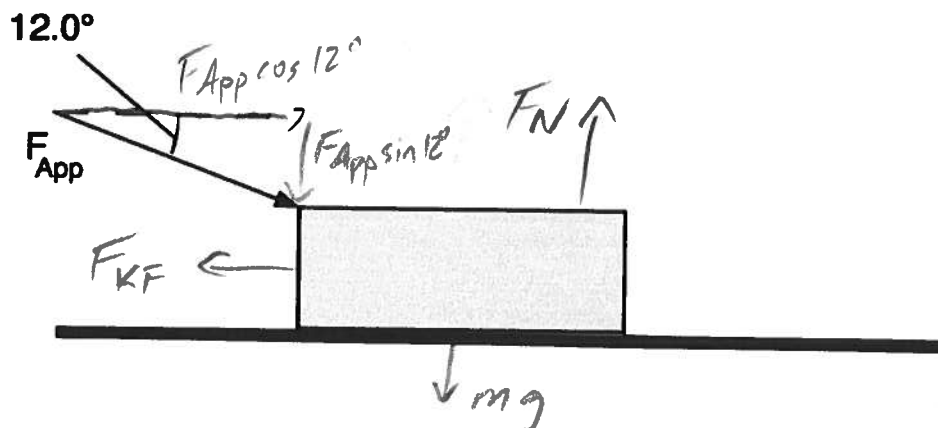


### Physics 10154 - Quiz 4D

A 22.0 kg block slides horizontally to the left across a rough surface with a coefficient of kinetic friction of 0.180. A 127 Newton applied force pushes on the block in a direction  $12.0^\circ$  below the horizontal as shown. Determine how many seconds it takes for the block to slide 2.00 meters starting from rest across the surface.



$$\Sigma F_y: F_N - F_{App} \sin 12^\circ - mg = 0$$

$$F_N = 127 \sin 12 + (22)(9.8) = 242$$

$$\Sigma F_x: F_{App} \cos 12^\circ - \mu_k F_N = ma$$

$$124.2 - (0.180)(242) = 22a$$

$$80.7 = 22a$$

$$a = 3.67 \text{ m/s}^2$$

$$\Delta x = v_0 t + \frac{1}{2} a t^2$$

$$2.00 = 0 + \frac{1}{2} (3.67) t^2$$

$$\Rightarrow \boxed{t = 1.045}$$