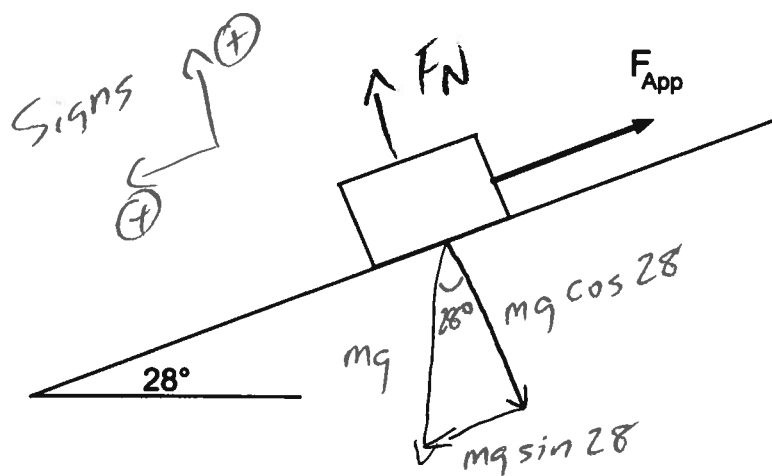


### Physics 10154 - Quiz 4B

A 23.0 kg block is initially at rest on a frictionless slope angled  $28^\circ$  above the horizontal. An applied force of 85.0 N is directed parallel to and up the ramp as shown.

- In what direction does the block accelerate, up or down the ramp?
- What is the magnitude of the normal force acting on the block?
- After the 2.50 seconds have elapsed, how far has the block moved?



$$F_{\text{App}} = 85.0 \text{ N}$$

$$mg \sin 28^\circ = 105.8 \text{ N}$$

a) Since  $mg \sin 28^\circ > F_{\text{App}}$ , mass slides down ramp.

$$\text{b) } \Sigma F_{\perp} = F_N - mg \cos 28^\circ = 0$$

$$\Rightarrow F_N = mg \cos 28^\circ = \boxed{199 \text{ N}}$$

$$\text{c) } \Sigma F_{\parallel} = mg \sin 28^\circ - F_{\text{App}} = m a$$

$$105.8 - 85 = 23a \Rightarrow a = 0.904 \text{ m/s}^2$$

$$\Delta s = v_0 t + \frac{1}{2} a t^2 = 0 + \frac{1}{2} (0.904) (2.5)^2 = \boxed{2.83 \text{ m}}$$