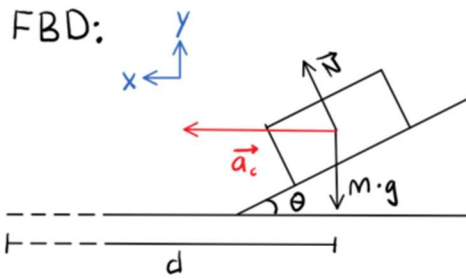


21-P-FA-AG-007



Given: $V, d, m, g = 9.8 \frac{m}{s^2}$

Find θ

$$[mph] \cdot 1609 \frac{m}{mile} \cdot \frac{1}{3600} \frac{h}{s} = [m/s]$$

constant d means no movement in $y \rightarrow \Sigma F_y = 0$

$$\Sigma F_x = m \cdot a_x = m \cdot a_c = N_x = N \cdot \sin \theta \rightarrow N \cdot \sin \theta = m \cdot \frac{v^2}{r} \quad (1)$$

$$\Sigma F_y = m \cdot \cancel{a_y} + N_y - m \cdot g = N \cdot \cos \theta - m \cdot g = 0 \rightarrow N = \frac{m \cdot g}{\cos \theta} \quad (2)$$

$$(2) \rightarrow (1) \quad \cancel{m} \cdot g \frac{\sin \theta}{\cos \theta} = \cancel{m} \cdot \frac{v^2}{r} \rightarrow \tan \theta = \frac{v^2}{g \cdot r} \rightarrow \theta = \tan^{-1} \left(\frac{v^2}{g \cdot r} \right)$$