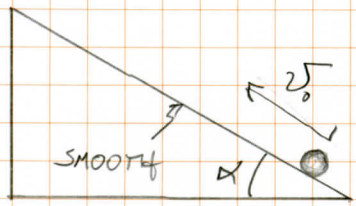
TM5 PR 2.16

TM5 2-16 FIND THE ROUND TRIP TIME FOR A PARTICLE SHOT UP A SLOPE α WITH v_0. EVALUATE FOR $v_0 = 2.4 \frac{m}{s}$, $\alpha = 26°$

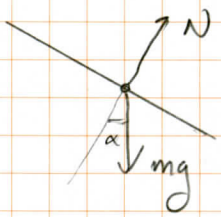


FIND THE PARTICLE'S ACCELERATION

$$\Sigma F_{\parallel} = ma_{\parallel}$$

$$mg\sin\alpha = ma$$

$$\Rightarrow a = g\sin\theta$$



NOW USE KINEMATICS (a = CONSTANT)

$$s = s_0 + v_{0s}t - \frac{1}{2}a_{0s}t^2$$

$$v_{0s}t = \frac{1}{2}(g\sin\alpha)t^2$$

$$\boxed{t = \frac{2v_0}{g\sin\alpha}}$$

FOR $v_0 = 2.4\ m/s$ & $\alpha = 26°$

$$t = \frac{2(2.4)}{(9.8)\sin(26°)} = \boxed{1.12\ s = t}$$