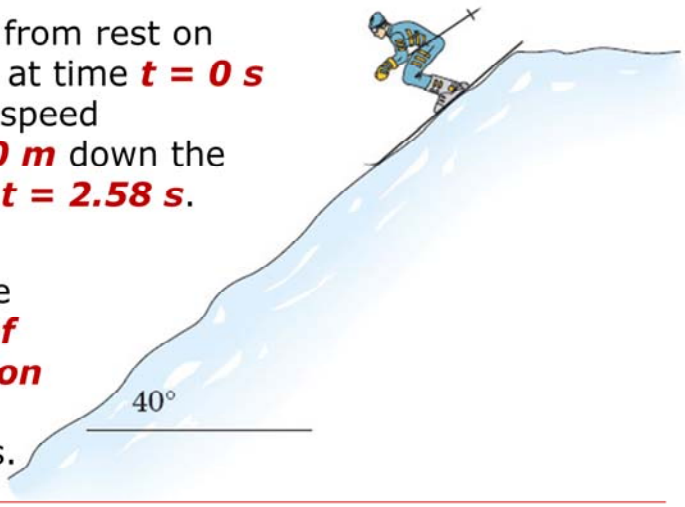
Rectilinear Motion: Exercise 2

A skier starts from rest on the 40° slope at time ***t = 0 s*** and passes a speed checkpoint ***20 m*** down the slope at time ***t = 2.58 s***.

Determine the ***coefficient of kinetic friction*** between the snow and skis.



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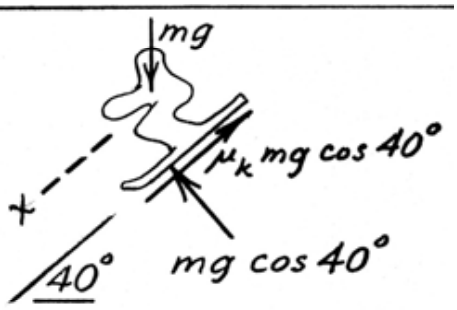

$\Sigma F_x = ma_x$: $mg \sin 40° - \mu_k mg \cos 40° = ma$

$a = 9.81(\sin 40° - \mu_k \cos 40°)$

$= 6.31 - 7.51\mu_k$

For constant accel. $s = v_0 t + \frac{1}{2} a t^2$:

$20 = 0 + \frac{1}{2}(6.31 - 7.51\mu_k)2.58^2$

$\mu_k = 0.0395$