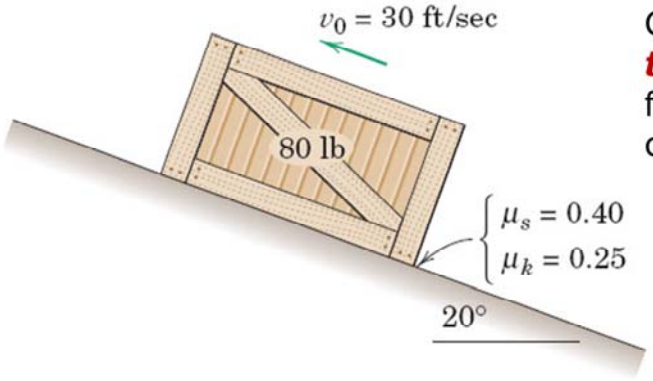
Rectilinear Motion: Exercise

The ***80-lb crate*** has a ***velocity*** of ***30 ft/s*** up the incline.



Calculate the ***time*** required for the crate to come to ***rest***.

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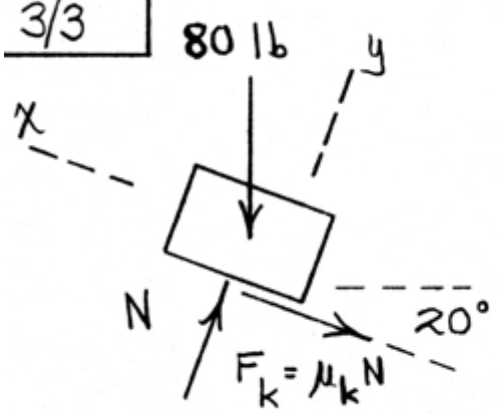

$\Sigma F_y = 0$: $N - 80\cos 20° = 0$

$N = 75.2$ lb

$\Sigma F_x = ma_x$:

$-0.25(75.2) - 80\sin 20° = \frac{80}{32.2}a$

$a = -18.58$ ft/sec^2

$v = v_0 + at$: $0 = +30 - 18.58t$, $t = 1.615$ sec

$v^2 = v_0^2 + 2a(s - s_0)$: $0^2 = 30^2 + 2(-18.58)d$

$d = 24.2$ ft

$v^2 = v_0^2 + 2a(s - s_0)$: $15^2 = 30^2 + 2(-18.58)d'$

$d' = 18.17$ ft