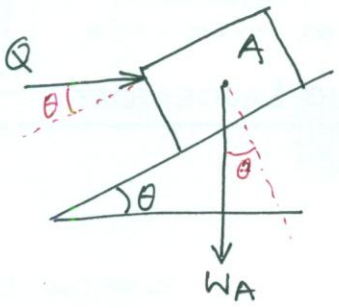
#1115/P.326



$Q = 40$ lb $\quad v_0 = 0$

$W_A = 50$ lb $\quad$ (a) $f_s = ?$

$\theta = 30^\circ$ $\quad$ (b) $v = ?$ for $S = 10$ ft

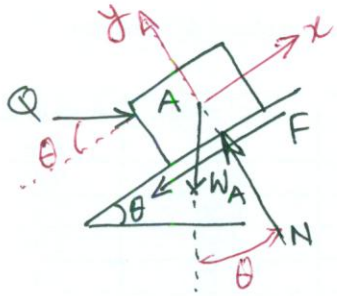
$f_k = 0.1$

Sol^n

$Q\cos\theta = 40\cos 30^\circ = 34.64$ lb

$W_A \sin\theta = 50 \sin 30^\circ = 25$ lb

$\because Q\cos\theta > W_A \sin\theta$, motion, if occurs will be upward



From the freebody of A

$\Sigma F_y = 0$, +y direct^n as +ve

$N - W_A\cos\theta - Q\sin\theta = 0$

$\Rightarrow N - 50\cos 30^\circ - 40\sin 30^\circ = 0$

$\therefore N = 63.3$ lb

For impending motion $\Sigma F_x = 0$, taking +x direct^n +ve

$Q\cos\theta - F - W_A\sin\theta = 0$

$\Rightarrow 40\cos 30^\circ - 63.3 \times f_s - 50\sin 30^\circ = 0$

$\therefore f_s = 0.152$

Note: If motion occurs then $\Sigma F = ma$

When the body is in motion, $\Sigma F_x = ma$

$\therefore Q\cos\theta - F - W_A\sin\theta = \frac{W_A}{g} \cdot a$

$\Rightarrow 40\cos 30^\circ - 0.1 \times 63.3 - 50\sin 30^\circ = \frac{50}{32.2} \times a$

$\therefore a = 2.13$ fps^2

Now $v^2 = v_0^2 + 2aS = 0 + 2 \times 2.13 \times 10$

$\therefore v =$ **6.52 fps**