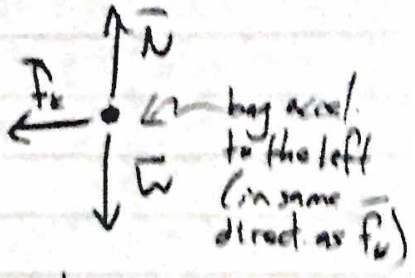
1420 Tutorial #4 SOLS

P1 ◻ Assume (kinetic) friction force is the key force acting on the bag to accelerate it from $v_0 = 0$ to $v_f = 2.0\ m/s$ (at which point bag stops moving rel. the conveyor belt)



$|\bar{f}_k| = \mu_k |\bar{N}| = \mu_k mg = 0.3(10)(9.8) \approx 29.4\ N$ ←

$(F_{net})_x = \sum F_x = f_k = ma = 10.0a \rightarrow a = 2.94\ m/s^2$

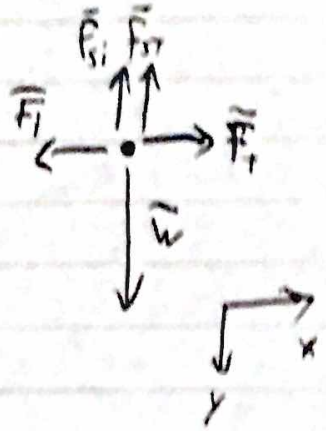
(this is the const. accel. the bag experiences)

$v_f^2 = v_0^2 + 2a(x_f - x_0) = 0 + 2(2.94)(x_f - 0) = 2.0^2$

$\rightarrow x_f = \frac{4.0}{2(2.94)} \approx$ **0.68 m = x_f**

Note: Static friction didn't directly come into play. Why?

P2 Let $\bar{F}_T$ be force from thumb and $\bar{F}_I$ be from index finger. $|\bar{F}_I| = |\bar{F}_T| = 6.0\ N$ (because book is at equilibrium)



◻ book will start to slip when $|\bar{w}| = \mu_s |\bar{F}_T| + \mu_s = |\bar{F}_I|$

So $|\bar{w}| = 2\mu_s(6.0) = 2(0.8)(6.0) \approx 9.6\ N$

→ **So the heaviest book would be ≈ 9.6 N**