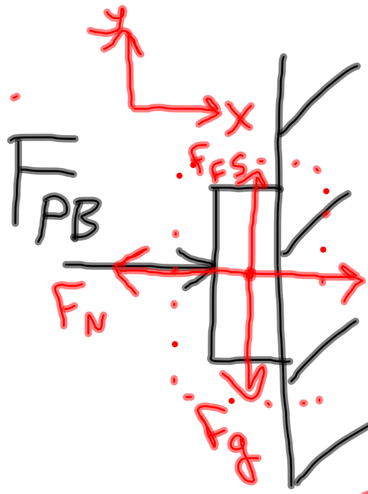
1. What is the minimum force on a person on book F_{PB}, which has to be applied horizontally so the book does not slip down along a vertical wall? Derive the F_{PB} in terms of the mass of the book, coefficient of friction, and any universal constants.



m, μ (Y)

$\sum F_y = m a_y$

$F_{fs} - F_g = 0$

$F_{fs} = F_g$

$\mu_s \cdot F_N = mg$

$\boxed{F_{PB} = \frac{mg}{\mu_s}}$

(X) $\sum F_x = m a_x$

$-F_N + F_{PB} = 0 \quad F_N = F_{PB} \Rightarrow \mu_s \cdot F_{PB} = mg$

Dec 8-7:42 AM

$$\boxed{F_{PB} = \frac{m \cdot g}{\mu_s}}$$

Dec 8-8:09 AM

HOOKE'S LAW.

$$\boxed{F_{SPR} = -k\Delta X}$$

F_{SPR} = FORCE OF THE SPRING

k = SPRING COEFFICIENT $\left[\frac{N}{m}\right]$

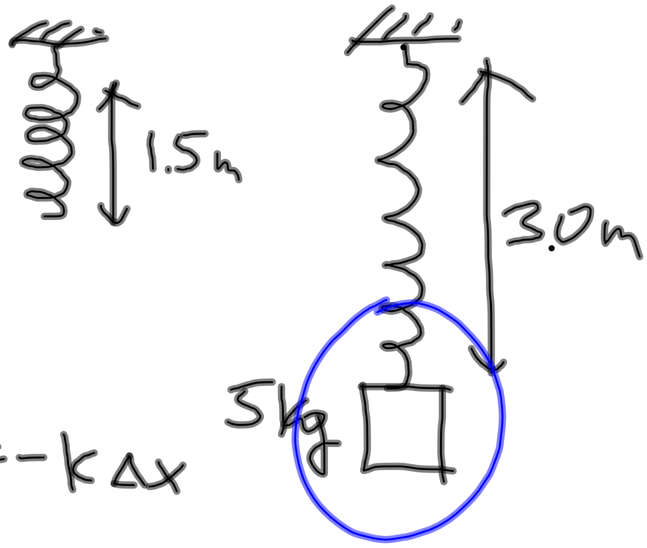
ΔX = CHANGE IN LENGTH

$-$ F_{SPR} IS ALWAYS IN THE OPPOSITE

Dec 8-8:17 AM

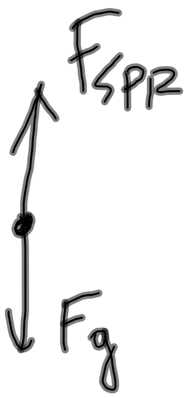
DIRECTION TO ΔX.

ex.1



$g = 10\,\frac{m}{s^2}$

$k = ?$



$F_{SPR} = -k\Delta x$

Dec 8-8:20 AM

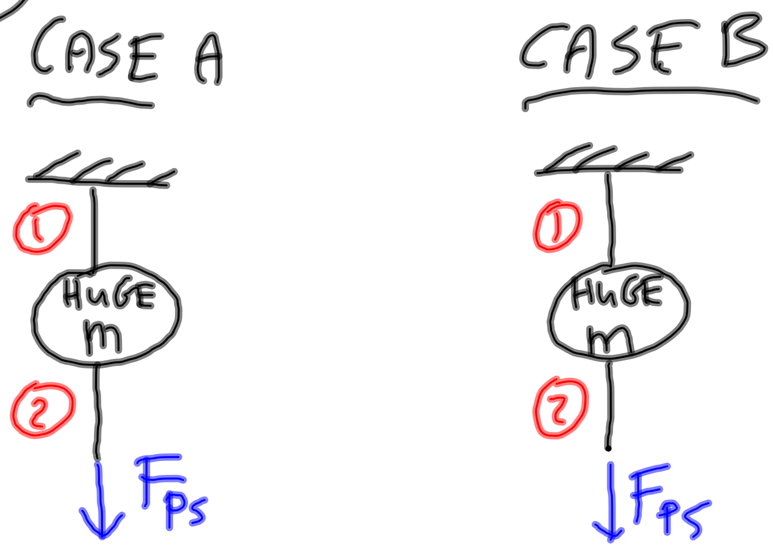
$$50 = -k(1.5)$$

$$\boxed{k = -33.3\,\frac{N}{m}}$$

Dec 8-8:27 AM

HW

Which string breaks first 1 or 2?



F_{PS} is a FAST jerk down.

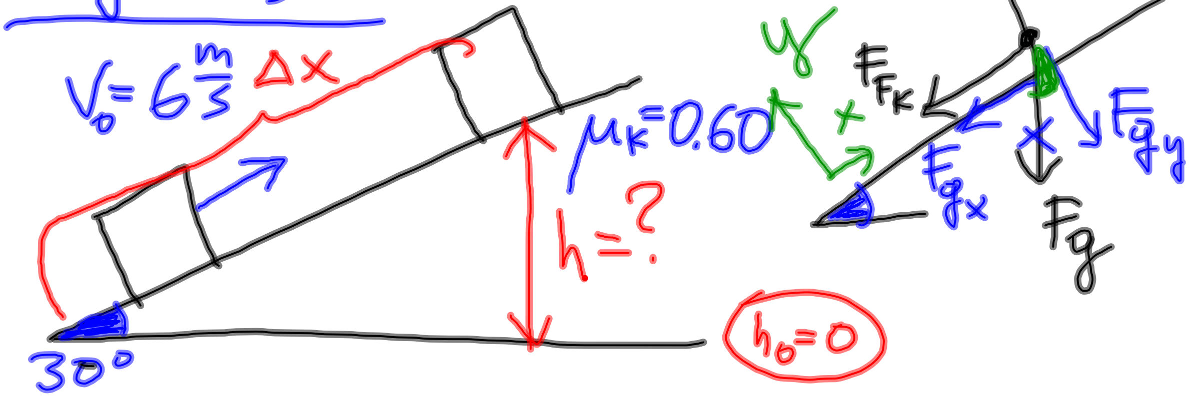
F_{PS} is a very SLOW pull down.

Dec 8-8:32 AM

COMBO PROBLEMS. (D+K)

$m = 10\,kg$

$g = 10\,\frac{m}{s^2}$



Dec 8-8:39 AM

$$\textcircled{x}\ \begin{cases} -F_{g_x} - F_{F_K} = m\,a_x \\ F_N - F_{g_y} = 0 \end{cases}\ \textcircled{y} \qquad \begin{cases} -F_g \sin 30° - \mu F_N = m a_x \\ F_N = F_{g_y} \end{cases}$$

$$-50 - 86.6\,\mu_K = 10\,a_x$$

$$\boxed{a_x = -10.2\,\frac{m}{s^2}}$$

Dec 8-8:53 AM

KINEMATICS. FIND Δx (INCL. PLANE)

THEN FIND h FROM TRIG.

$V_0 = 6 \frac{m}{s}$

$V = 0$

$a_x = -10.2 \frac{m}{s^2}$

$\Delta x = ?$

$t = ?$

$$\Delta x = \frac{V^2 - V_0^2}{2 \cdot a_x}$$

$$\Delta x = \frac{0^2 - 6^2}{2(-10.2)}$$

$$\boxed{\Delta x = 1.76\text{ m}}$$

Dec 8-8:57 AM

FROM TRIG. $\sin 30^\circ = \frac{h}{\Delta x}$

$h = \Delta x \cdot \sin 30^\circ$

$$\boxed{h = 0.88\text{ m}}$$

Dec 8-9:07 AM