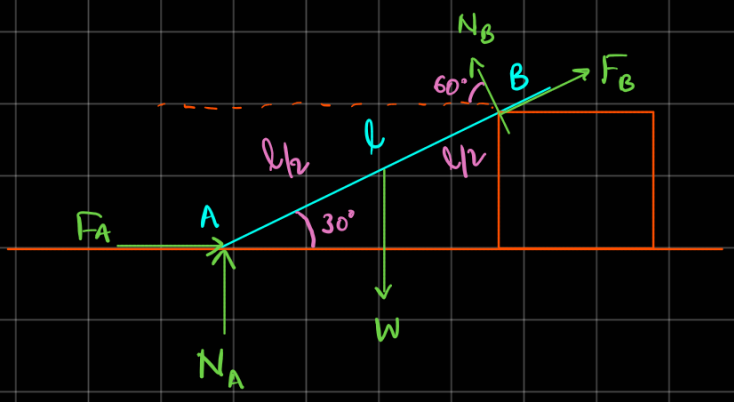
3. $\theta = 30°$

μ_s at A = μ_s at B



$F_A = \mu_s . N_A$

$F_B = \mu_s . N_B$

$\Sigma F_y = 0$

$N_A - W + N_B \sin 60 + \mu_s N_B \sin 30 = 0$

$\Sigma F_x = 0$

$\mu_s N_A - N_B \cos 60° + \mu_s N_B \cos 30° = 0$

$\Sigma M_A = 0$

$-\frac{Wl}{2} \cos 30 + l N_B = 0$

$l N_B = \frac{Wl \cos 30}{2}$

$N_B = \frac{W\sqrt{3}}{4} = 0.433 W$

$\mu_s N_A - 0.2165 W + 0.375 \mu_s W = 0$

$N_A - W + 0.375 W + 0.2165 \mu_s W = 0 \Rightarrow N_A - 0.625 W + 0.2165 \mu_s W = 0$

$N_A = 0.625 W - 0.2165 \mu_s W$ — (I)

$\mu_s N_A = 0.2165 W - 0.375 \mu_s W$ — (II)

(I)/(II)

$\frac{N_A}{\mu_s N_A} = \frac{W(0.625 - 0.2165 \mu_s)}{W(0.2165 - 0.375 \mu_s)}$

$\frac{1}{\mu_s} = \frac{0.625 - 0.2165 \mu_s}{0.2165 - 0.375 \mu_s}$

$$\frac{\mu_s}{} = \frac{}{0.2165 - 0.375\,\mu_s}$$

$$0.2165 - 0.375\,\mu_s = 0.625\,\mu_s - 0.2165\,(\mu_s)^2$$

$$0.2165\,(\mu_s)^2 - \mu_s + 0.2165 = 0$$

$$\mu_s^2 - 4.62\,\mu_s + 1 = 0$$

$\mu_s = 4.4$ ✗

$\mu_s = 0.227$

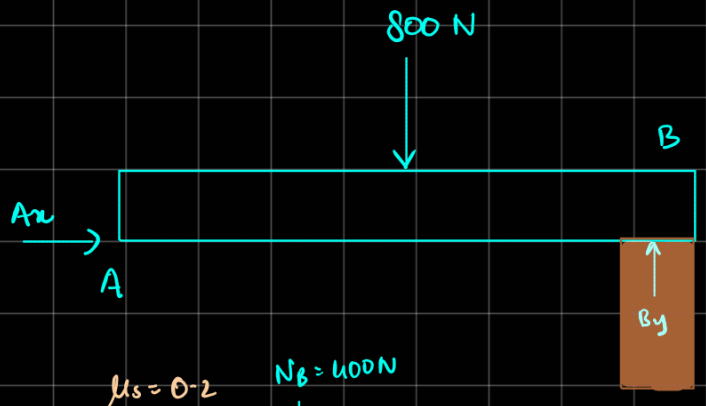
Coefficient of fraction (μ_s) is always between 0 & 1.

$$\boxed{0 \leq \mu_s \leq 1}$$

4. $\Sigma M_A = 0$

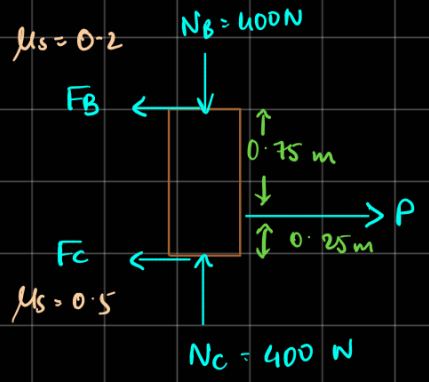
$$-800(2) + B_y(4) = 0$$

$$B_y = 400\ N = N_B$$



$F_B = \mu_s N_B$

$F_C = \mu_s N_C$



$\Sigma M_C = 0$

$$-P(0.25) + \mu_s N_B (1) = 0$$

$$P = \frac{0.2 \times 400}{0.25}$$

$$= 320\ N$$

$\Sigma M_B = 0$

$P(0.75) - \mu_s N_c (1) = 0$

$$P = \frac{0.5 \times 400}{0.75}$$

$$\underline{P = 266.67\ N}$$

∴ Force required to pull post out of place = $\underline{266.67\ N}$ at point C