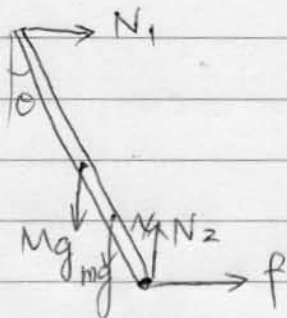


4. (a)



$$\begin{cases} N_2 = (M+m)g \\ N_1 = f \end{cases}$$

$$mgx \cos\theta + Mg \times \frac{L}{2} \cos\theta - N_1 L \sin\theta = 0$$

When it's ^{most} dangerous. $f = N_1$ is ^{the} biggest.

$$N_1 = \frac{Mg}{2} \cot\theta + \frac{mgx}{L} \cot\theta$$

So when $x = L$, N_1 is biggest.

That's to say when the man reaches the top of the ladder.

$$(b) \quad N_{\max} = \frac{Mg}{2} \cot\theta + mg \cot\theta = \left(\frac{M}{2} + m\right) g \cot\theta$$

$$= \mu_s N_2 = \mu_s (M+m)g$$

$$\mu_s = \frac{\frac{M}{2} + m}{M+m} \cot\theta$$

This is the expression for μ_s .