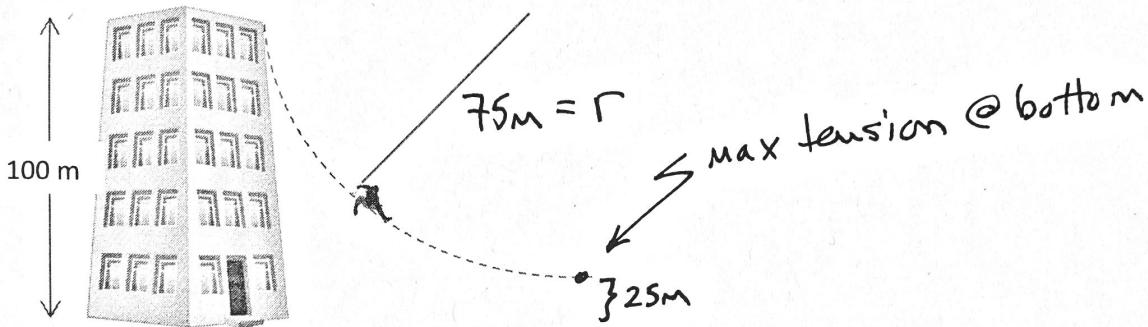


Spiderman Problem

Name: _____ Date: _____

Spiderman (mass of 70kg) swings from rest on an 75 m long web to catch the Green Goblin. The web will break if the tension in the web exceeds 2500N. What is the fate of Spiderman? (or calculate the tension in the web at the bottom of the swing).



speed at bottom:

$$mgh_1 = mgh_2 + \frac{mv^2}{2}$$

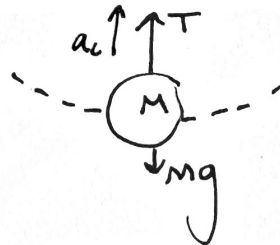
$$2mg(h_1 - h_2) = mv^2$$

$$v^2 = 2g(h_1 - h_2)$$

$$T = 3mg$$

since $h_1 - h_2 = r$

@ bottom



$$\Sigma F = ma_c$$

$$T - mg = \frac{mv^2}{r}$$

$$T = mg + \frac{m2g(h_1 - h_2)}{r}$$

$$T = mg \left(1 + \frac{2(h_1 - h_2)}{r} \right)$$

$$= (70)(9.8) \left[1 + \frac{2(100 - 25)}{75} \right]$$

$$T = (70)(9.8)(3)$$

$$= 2058 \text{ N (does not break)}$$