20-P-WE-AF-015

Conservative of Energy: Beginner

Q: A trapeeze artist of a mass of M kg is attempting a new trick. The are lifted to angle of theat1 and aid are releasied from cord A, A+thetaΣ they let of the bar to go into the next trick. If the ropes do NO work on the artist, what is the speed just before they let go. What is the normal acceleration

- Neglect size and air resistance

A:

$$T_A + V_A = T_B + V_B$$

$$0 + mg(h - l\cos\theta_1) = \tfrac{1}{2}mv^2 + mg(h - l\cos\theta_2)$$

$$\tfrac{1}{2}v^2 = g\left[(h - l\cos\theta_1) - (h - l\cos\theta_2)\right]$$

$$\tfrac{1}{2}v^2 = gl(\cos\theta_2 - \cos\theta_1)$$

$$a_n = \frac{mv^2}{l}$$

$$v = \sqrt{2gl(\cos\theta_2 - \cos\theta_1)}$$

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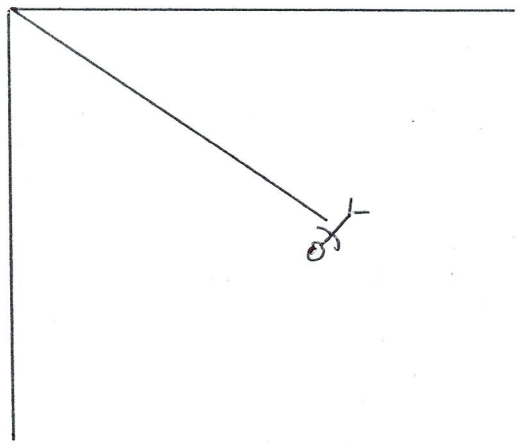

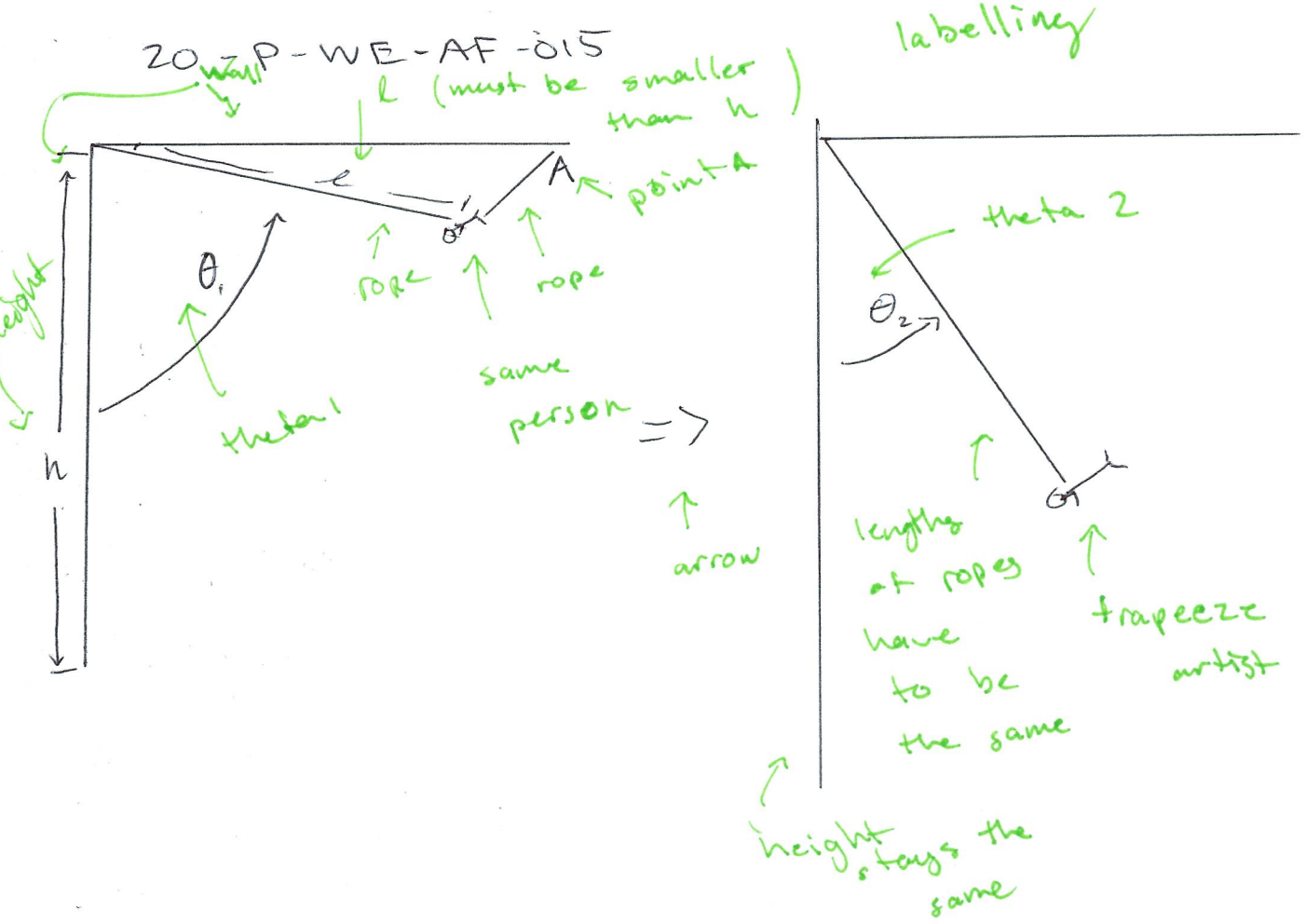
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wall
L (must be smaller than h)
point A
height
h
θ1
theta 1
rope
rope
same person =>
arrow
labelling
theta 2
θ2
lengths of ropes have to be the same
trapeeze artist
height stays the same