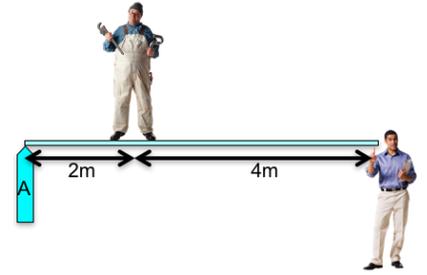


Big Exam! #3

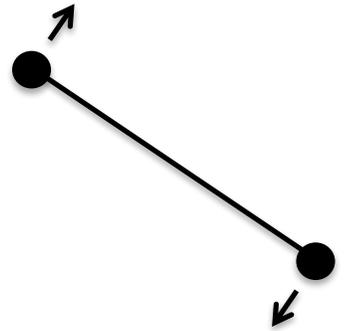
#1 I am helping a 60 kg friend do some construction work by supporting one side of a (very light) plank for him to stand on. How much force do I need to support with my finger so that he doesn't fall?

- We hope that this structure stays still. What does that *mean* in terms of physics?
- What do you know about the forces and torques on the structure given your statement above?
- Please set this up in fine form. Did you define a lens? Did you make a FBD? Did you write out the equations and calculate all the forces and torques? Did you define a direction... a center of rotation?



#2 You see two equal masses tied together with a string spinning in outer space at ω_o when a motor at the center pulls them both inward such that the final diameter of their paths is $1/3$ the original diameter, or, $d \Rightarrow \frac{1}{3} d_o$.

Provide reasons and show work please.



a) When you look at this system, what do you know won't change? What is conserved, and why do you know it's conserved?

b) By what factor does the momentum of inertia change?, $I \Rightarrow \underline{\hspace{1cm}} I_o$.

c) By what factor does the angular momentum change? $\vec{l} \Rightarrow \underline{\hspace{1cm}} \vec{l}_o$

d) By what factor does the angular velocity change? $\vec{\omega} \Rightarrow \underline{\hspace{1cm}} \vec{\omega}_o$

e) By what factor does the kinetic energy change? $E_K \Rightarrow \underline{\hspace{1cm}} E_{K_o}$

Name _____