Torque Problems

* Translational v. Rotational Motion
* Center of Mass

$\tau = Fr\sin\theta$

Jar lids — the larger the lid, the easier to unscrew.

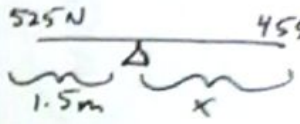
Translational Equilibrium

$\Sigma F_{net} = 0$

Rotational Equilibrium

$\Sigma \tau_{net} = 0$

(1) A seesaw supports two people who weigh 455 N and 525 N, respectively. The fulcrum is under the center of gravity of the board. The person with 525 N is 1.5 m from the center.

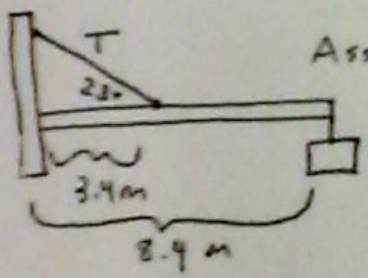


a) Where does the smaller person sit to balance it?

b.) Find the upward force on the seesaw by the fulcrum.

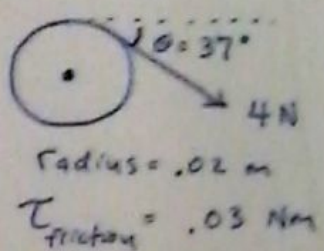
(2) A 65 kg painter stands on a 15 kg board held up by two supports. Calculate the force from the two supports:

(3)



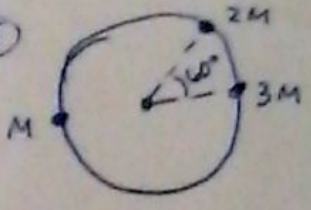
Assume static equilibrium, find the tension in the wire. Force gravity on the beam is 425 N.

(4)



What is the net torque acting on the wheel?

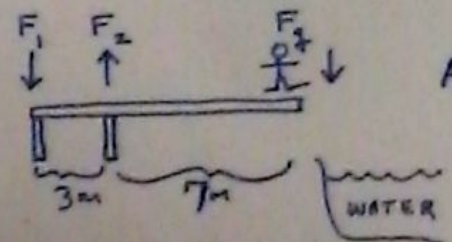
(5)



A wheel of radius R is made of a uniform solid disk with a horizontal frictionless axle at its center. 3 small objects M, 2M, and 3M are attached to the disk at the locations shown. What is net torque?

A) 0 B) 3MgR C) $(2+\sqrt{3})$MgR D) 4MgR E) 6MgR

(6)



A man prepares to dive into the water at the end of a diving board. His mass is 80 kg and $g = 10\ m/s^2$. Find the force (F_1) required to keep the board in static equilibrium. Board mass is 0.