Announcements

- Quiz 2 this week
- No class Friday (9/28/18) ☺

❑ Upcoming deadlines:

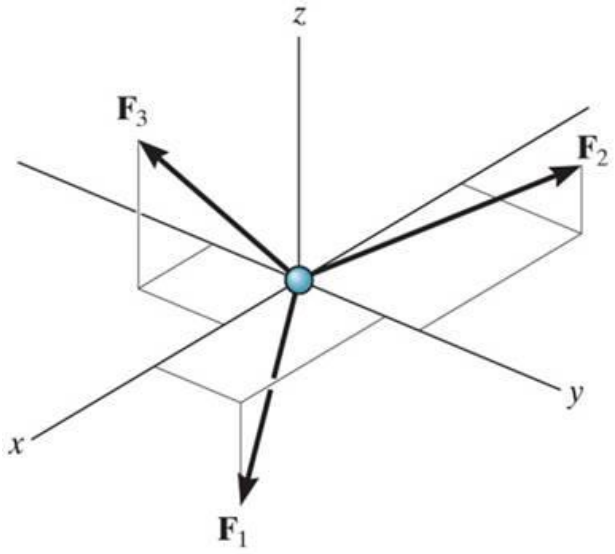
- Tuesday (9/24)
  - PL HW
- Friday (9/28)
  - Written Assignment

Chapter 5: Equilibrium of Rigid Bodies

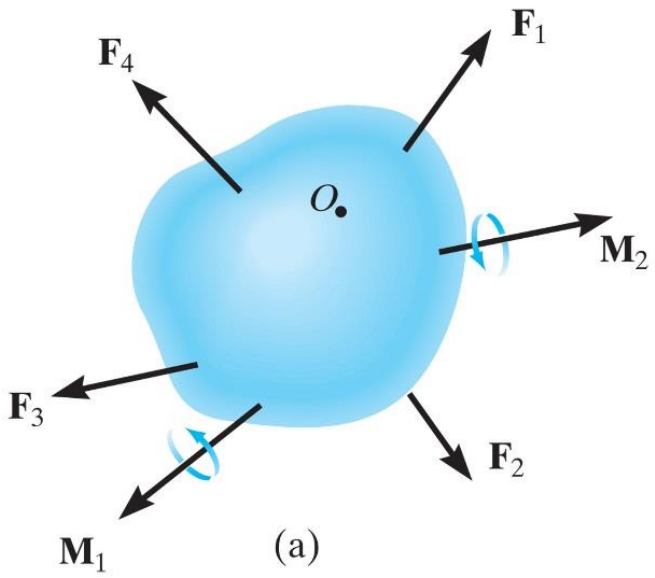
Goals and Objectives

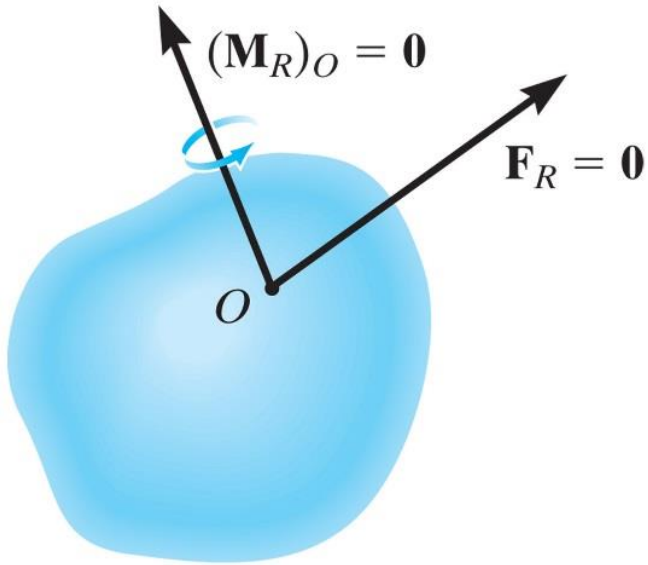
- Analysis procedure for a rigid body at equilibrium
- Identify support reactions

Equilibrium of a Rigid Body



In contrast to the forces on a particle, the forces on a rigid-body are not usually concurrent and may cause rotation of the body. We can reduce the force and couple moment system acting on a body to an equivalent resultant force and a resultant couple moment at an arbitrary point O.





Equilibrium of a Rigid Body

Static equilibrium:

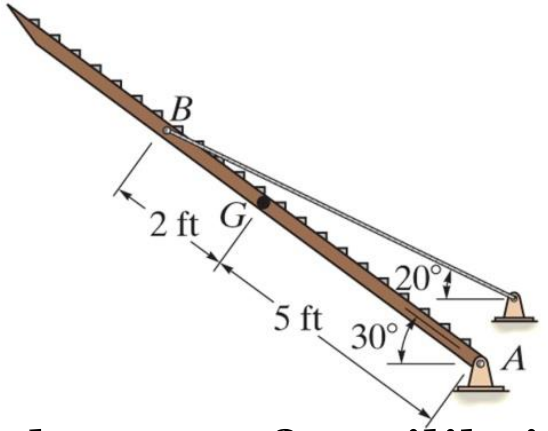
Maintained by reaction forces and moments

Assumption of rigid body

Process of solving rigid body equilibrium problems

The uniform truck ramp has weight 400 lb and is pinned to the body of the truck at each side and held in the position shown by the two side cables. Determine the reaction forces at the pins and the tension in the cables.

1. Create idealized model (modeling and assumptions)

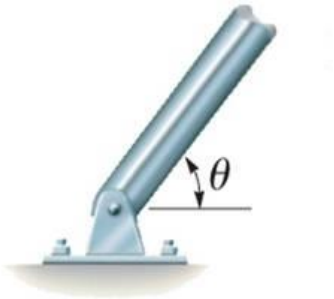


2. Draw free body diagram showing ALL the external (applied loads and supports)

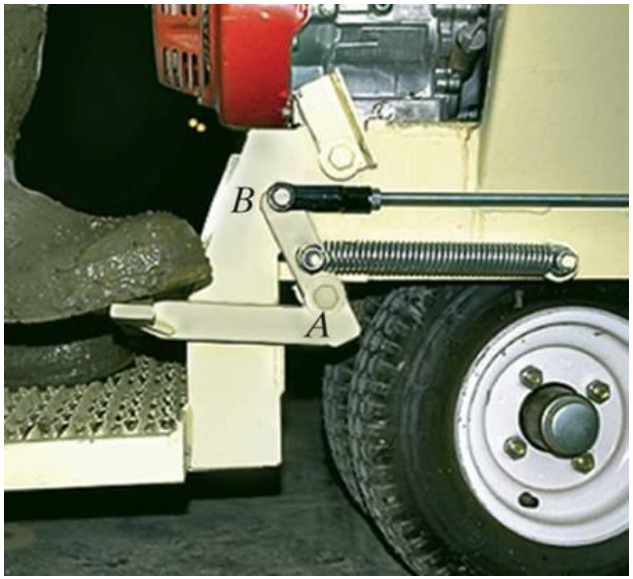
3. Apply eqns of equilibrium

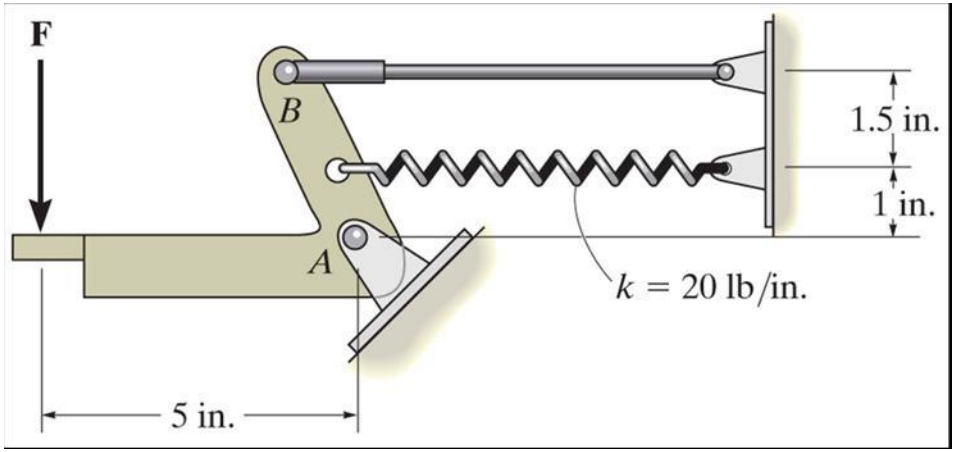
Equilibrium in two-dimensional bodies

Support reactions



The operator applies a vertical force to the pedal so that the spring is stretched 1.5 in. and the force in the short link at B is 20 lb. Determine the vertical force applied to the pedal.





Find the tension in cable B given the weight of the cage.