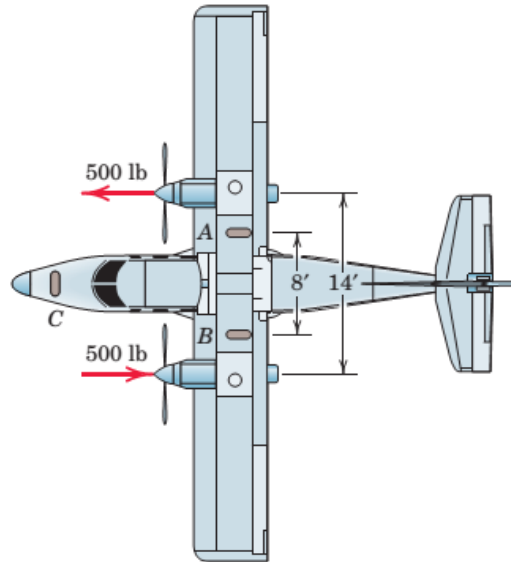
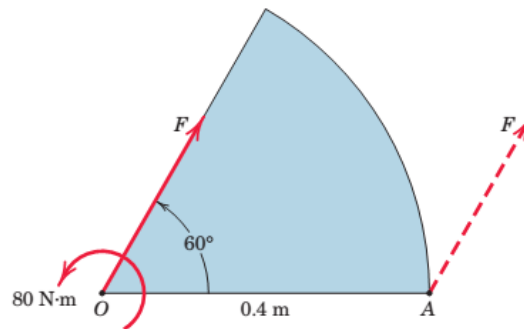




Problem 1. As part of a test, the two aircraft engines are revved up and the propeller pitches are adjusted so as to result in the fore and aft thrusts shown. What force F must be exerted by the ground on each of the main braked wheels at A and B to counteract the turning effect of the two propeller thrusts? Neglect any effects of the nose wheel C , which is turned 90° and unbraked.

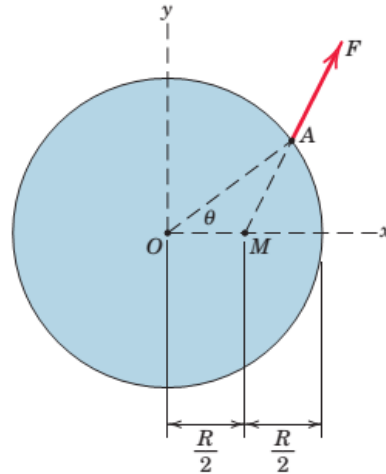


Problem 2. A force–couple system acts at O on the circular sector. Determine the magnitude of the force F if the given system can be replaced by a stand-alone force at corner A of the sector.

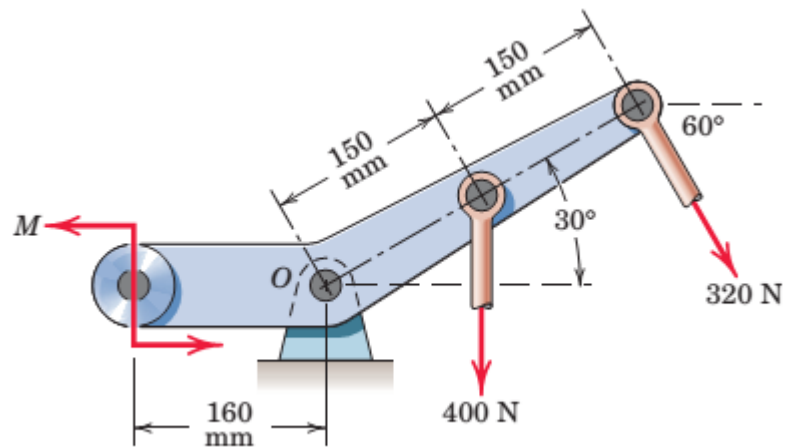




Problem 3. The force F acts along line MA , where M is the midpoint of the radius along the x -axis. Determine the equivalent force–couple system at O if $\theta = 40^\circ$.



Problem 4. If the resultant of the two forces and couple M passes through point O , determine M .





Problem 5. A rear-wheel-drive car is stuck in the snow between other parked cars as shown. In an attempt to free the car, three students exert forces on the car at points A, B, and C while the driver's actions result in a forward thrust of 40 lb. acting parallel to the plane of rotation of each rear wheel. Treating the problem as two-dimensional, determine the equivalent force–couple system at the car center of mass G and locate the position x of the point on the car centerline through which the resultant passes. Neglect all forces not shown.

