Statics Handout #3:

Homework #3 Assignment: 3.13, 22, 48, 58, 77, 97, 120

3.12 It is known that a force with a moment of 960 N · m about D is required to straighten the fence post CD. If $d = 2.80$ m, determine the tension that must be developed in the cable of winch puller AB to create the required moment about point D.

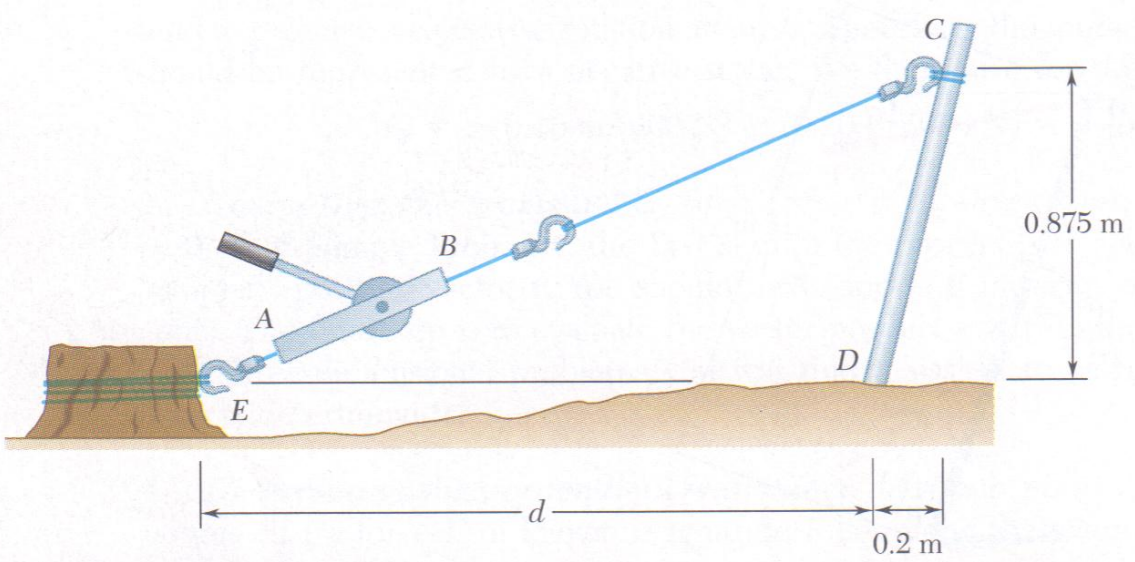

Fig. P3.11, P3.12 and *P3.13*

3.13 It is known that a force with a moment of 960 N · m about D is required to straighten the fence post CD. If the capacity of winch puller AB is 2400 N, determine the minimum value of distance d to create the specified moment about point D.

3.21 Before the trunk of a large tree is felled, cables AB and BC are attached as shown. Knowing that the tensions in cables AB and BC are 555 N and 660 N, respectively, determine the moment about O of the resultant force exerted on the tree by the cables at B.

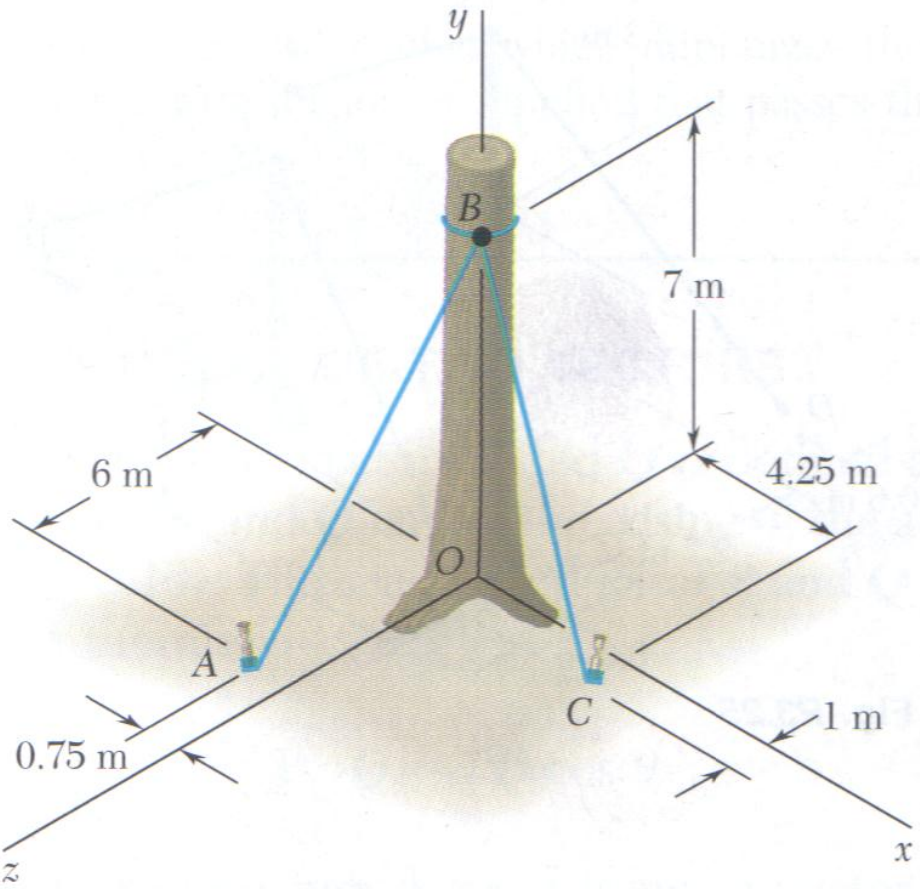

Fig. P3.21

3.22 A farmer uses a rope and pulley to lift a bale of hay of mass 26 kg. Determine the moment about A of the resultant force exerted on the pulley by the rope if the center of the pulley C lies 0.3 m below point B and 7.1 m above the ground.

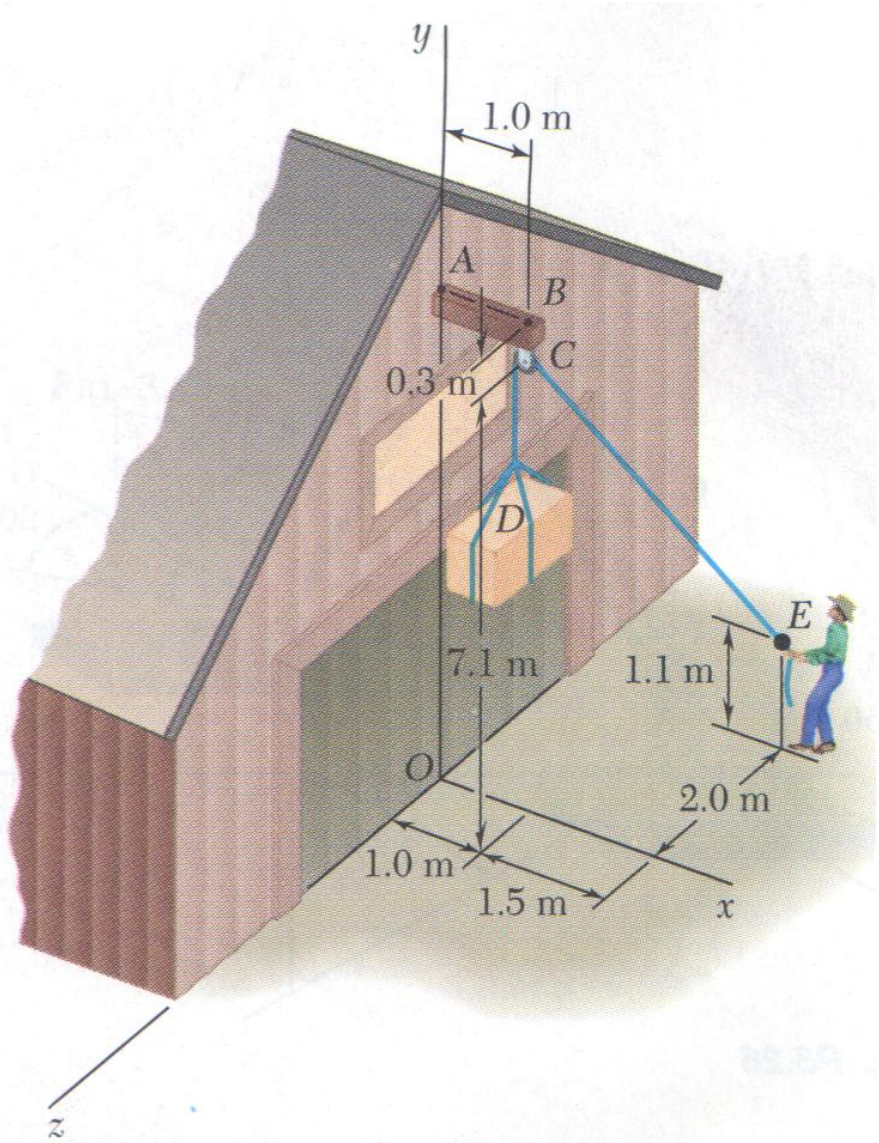

Fig. P3.22

3.47 The 0.61 × 1.00-m lid *ABCD* of a storage bin is hinged along side *AB* and is held open by looping cord *DEC* over a frictionless hook at *E*. If the tension in the cord is 66 N, determine the moment about each of the coordinate axes of the force exerted by the cord at *D*.

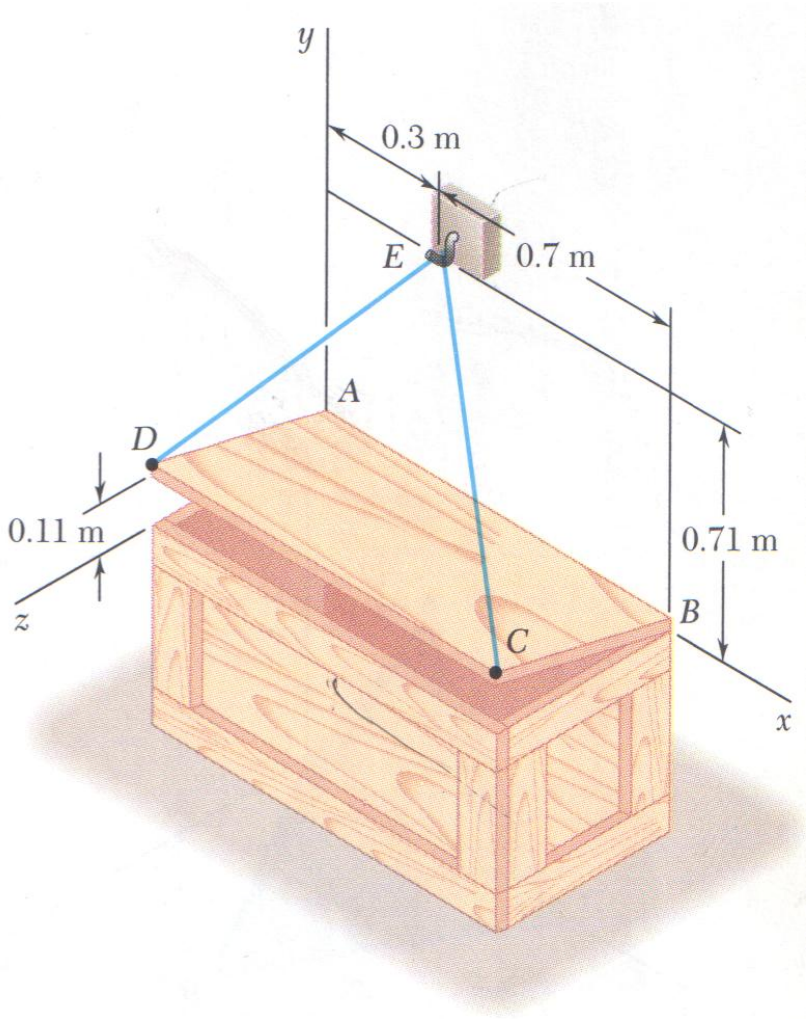

Fig. P3.47 and P3.48

3.48 The 0.61 × 1.00-m lid *ABCD* of a storage bin is hinged along side *AB* and is held open by looping cord *DEC* over a frictionless hook at *E*. If the tension in the cord is 66 N, determine the moment about each of the coordinate axes of the force exerted by the cord at *C*.

3.57 A sign erected on uneven ground is guyed by cables EF and EG. If the force exerted by cable EF at E is 46 lb, determine the moment of that force about the line joining points A and D.

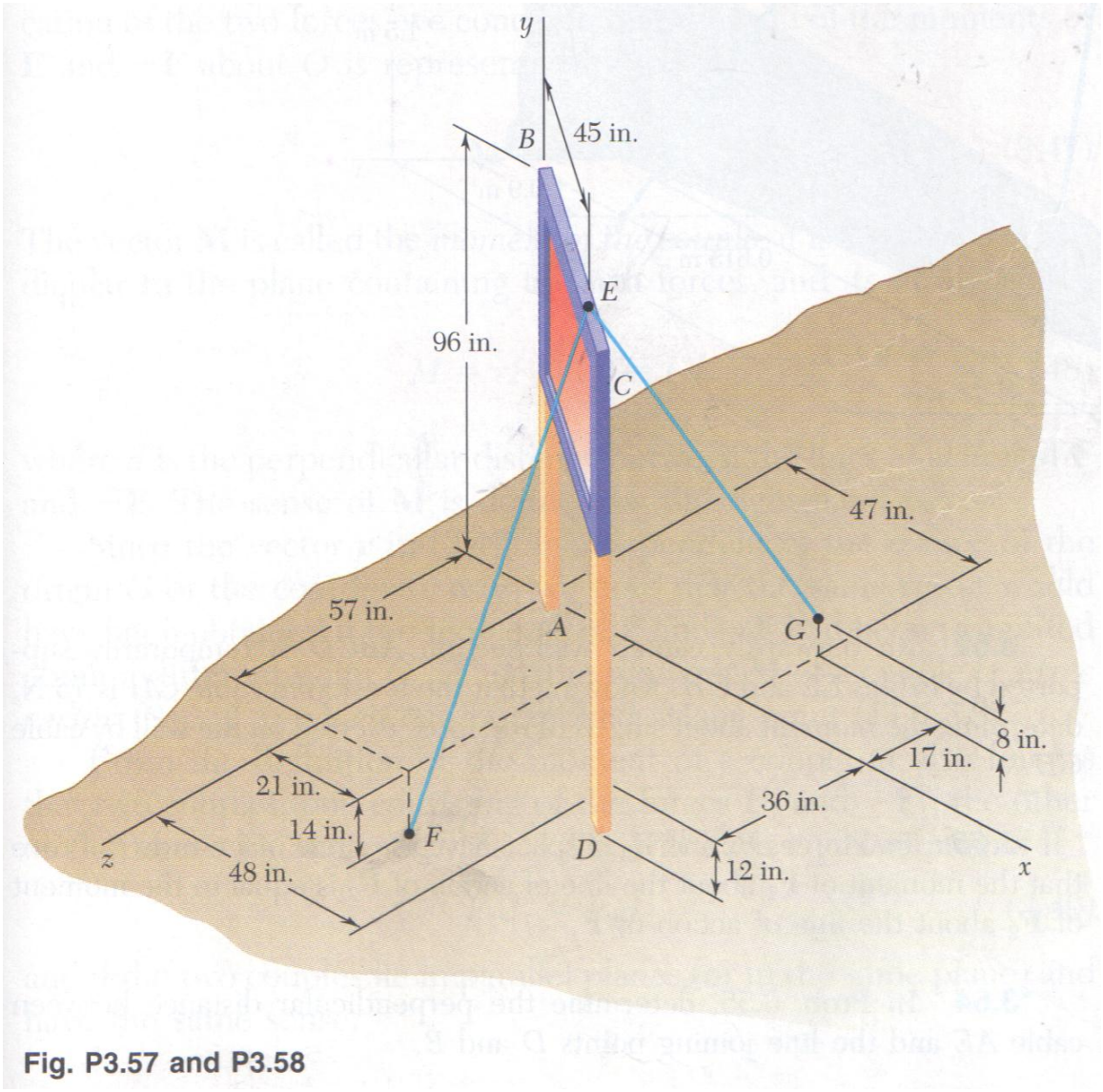

Fig. P3.57 and P3.58

3.58 A sign erected on uneven ground is guyed by cables EF and EG. If the force exerted by cable EG at E is 54 lb, determine the moment of that force about the line joining points A and D.

3.76 If $P = 0$, replace the two remaining couples with a single equivalent couple, specifying its magnitude and the direction of its axis.

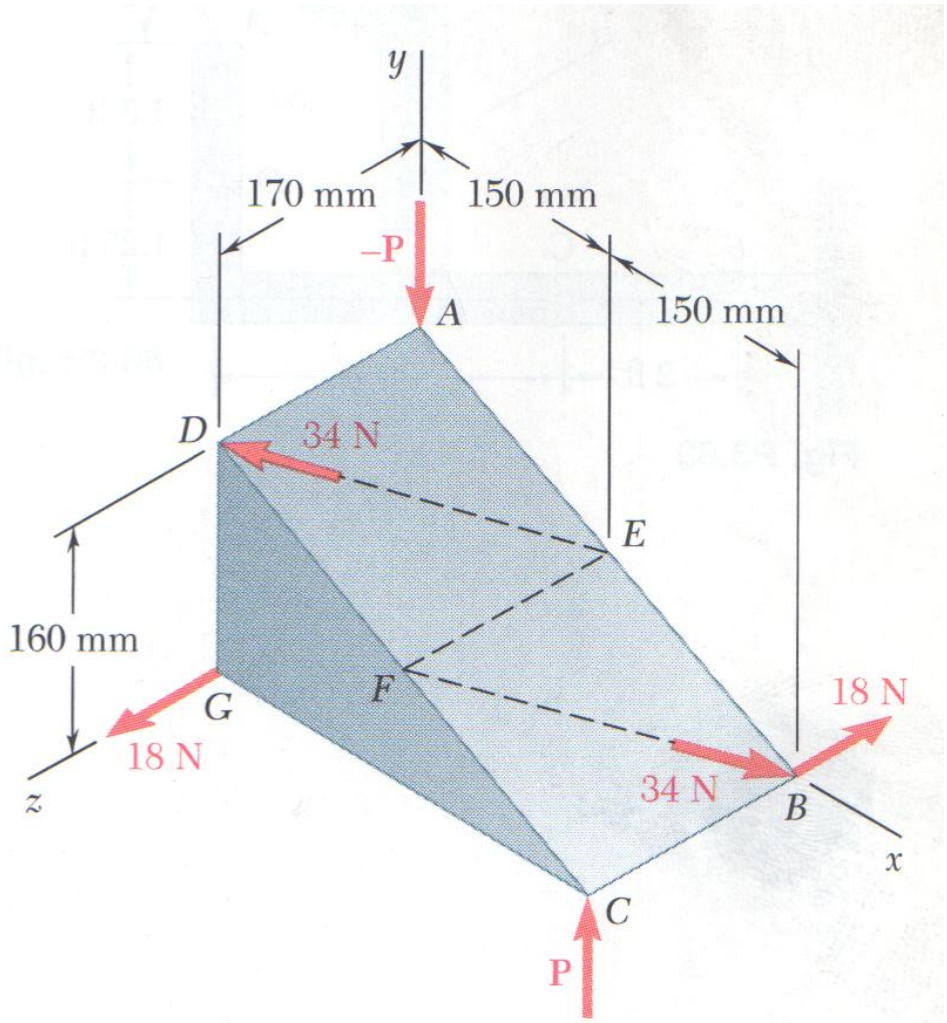

Fig. P3.76

3.77 If $P = 0$, replace the two remaining couples with a single equivalent couple, specifying its magnitude and the direction of its axis.

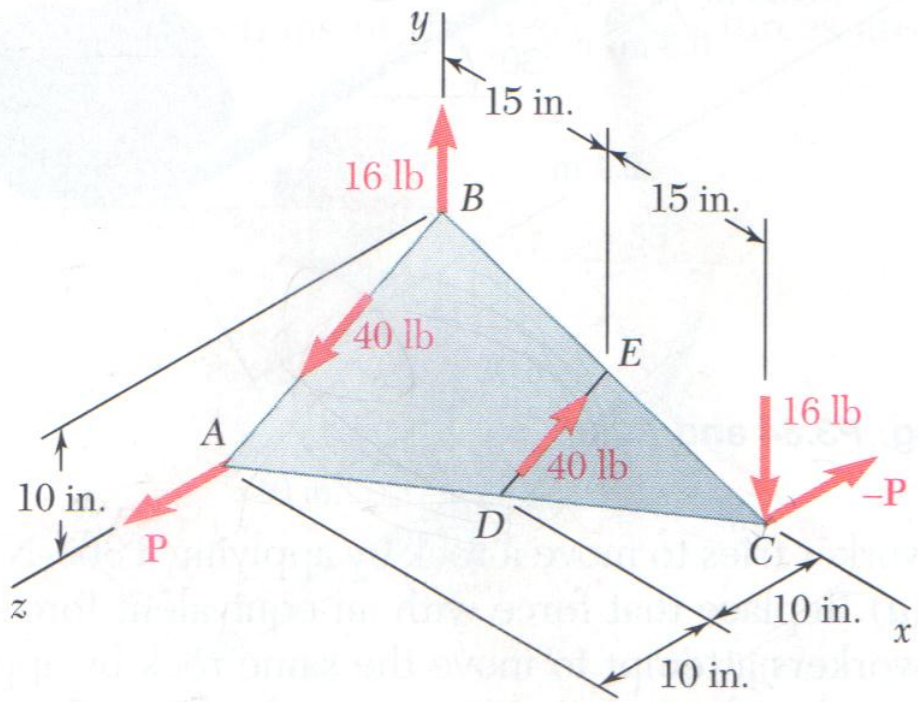

Fig. P3.77

3.96 To keep a door closed, a wooden stick is wedged between the floor and the doorknob. The stick exerts at B a 175-N force directed along line AB. Replace that force with an equivalent force-couple system at C.

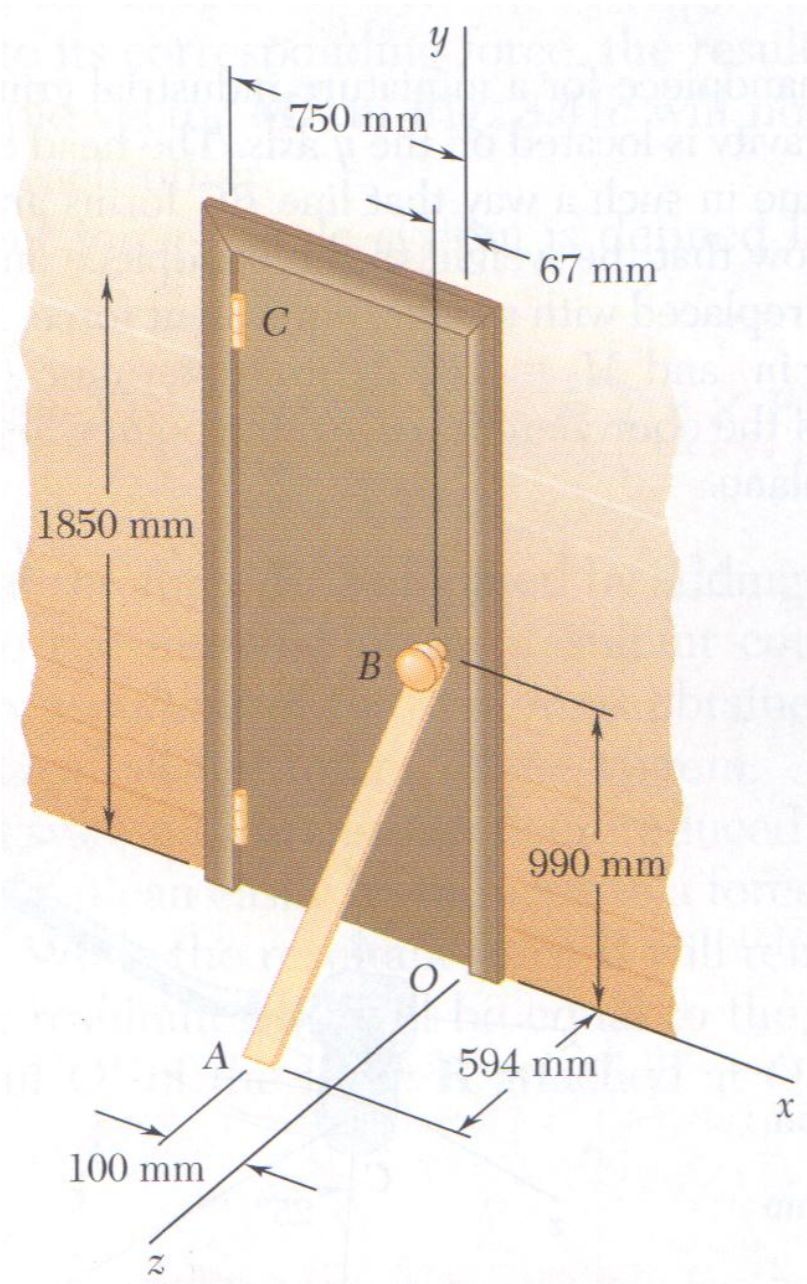

Fig. P3.96

3.97 A 110-N force acting in a vertical plane parallel to the yz plane is applied to the 220-mm-long horizontal handle AB of a socket wrench. Replace the force with an equivalent force-couple system at the origin O of the coordinate system.

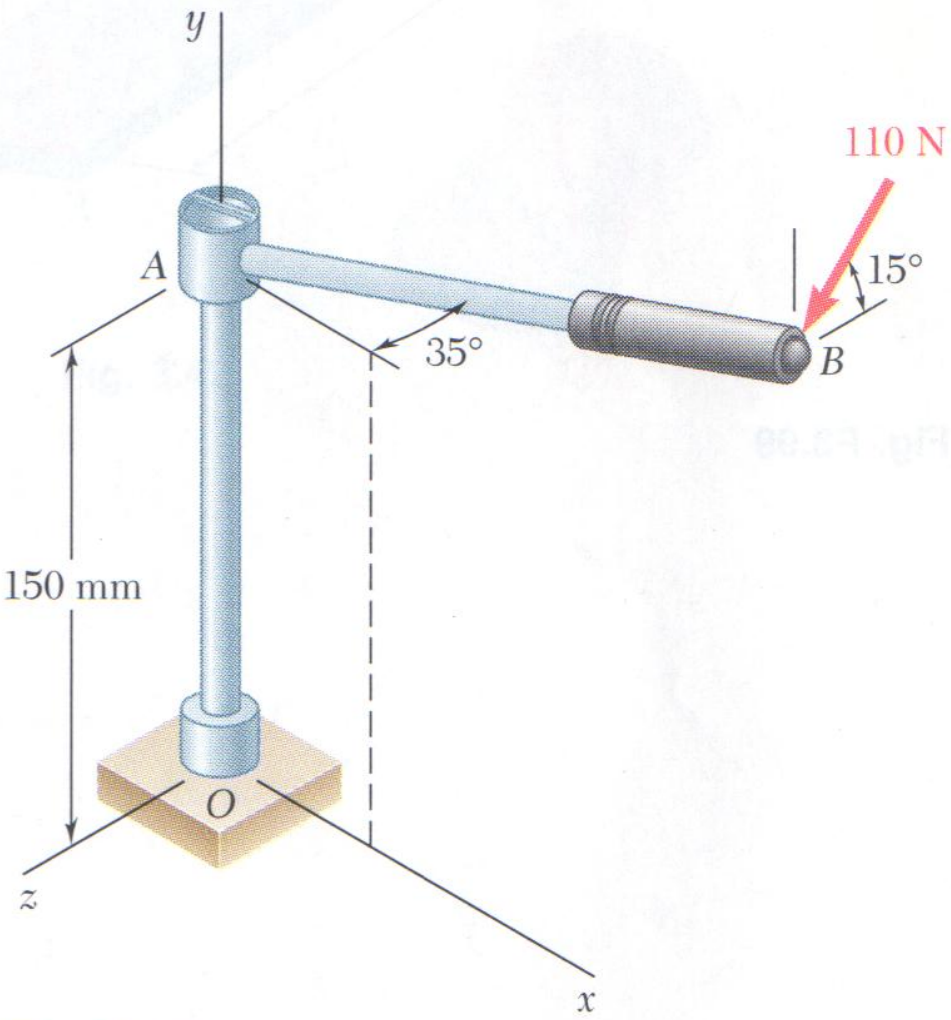

Fig. P3.97

3.119 As plastic bushings are inserted into a 60-mm-diameter cylindrical sheet metal enclosure, the insertion tools exert the forces shown on the enclosure. Each of the forces is parallel to one of the coordinate axes. Replace these forces with an equivalent force-couple system at C.

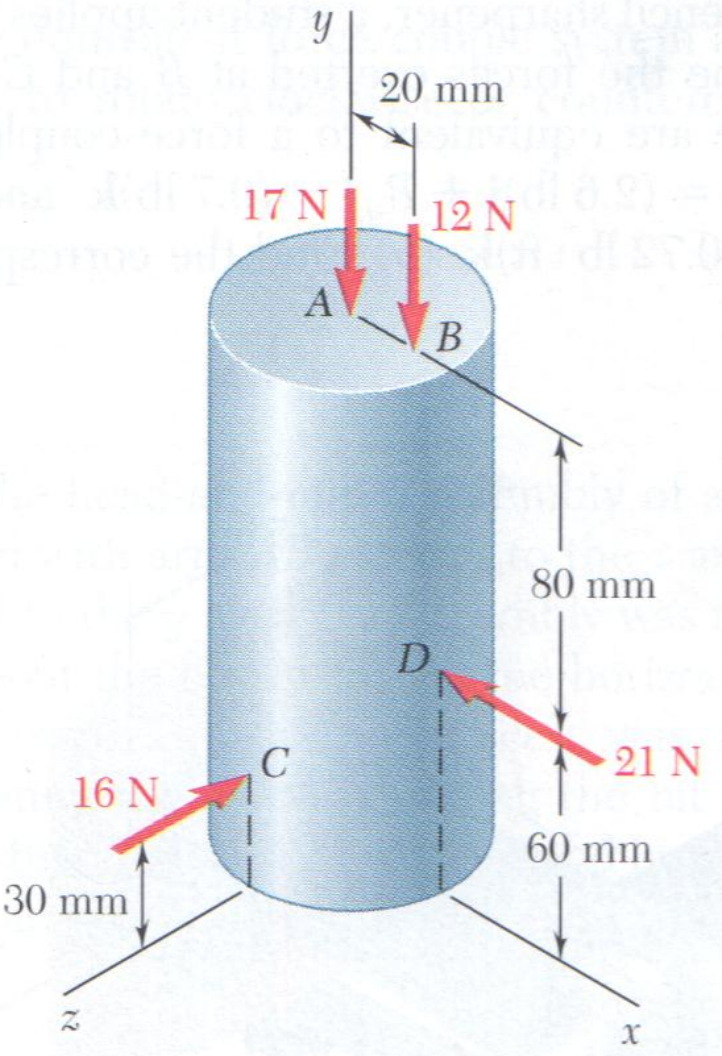

Fig. P3.119

3.120 Two 150-mm-diameter pulleys are mounted on line shaft AD. The belts at B and C lie in vertical planes parallel to the yz plane. Replace the belt forces shown with an equivalent force-couple system at A.

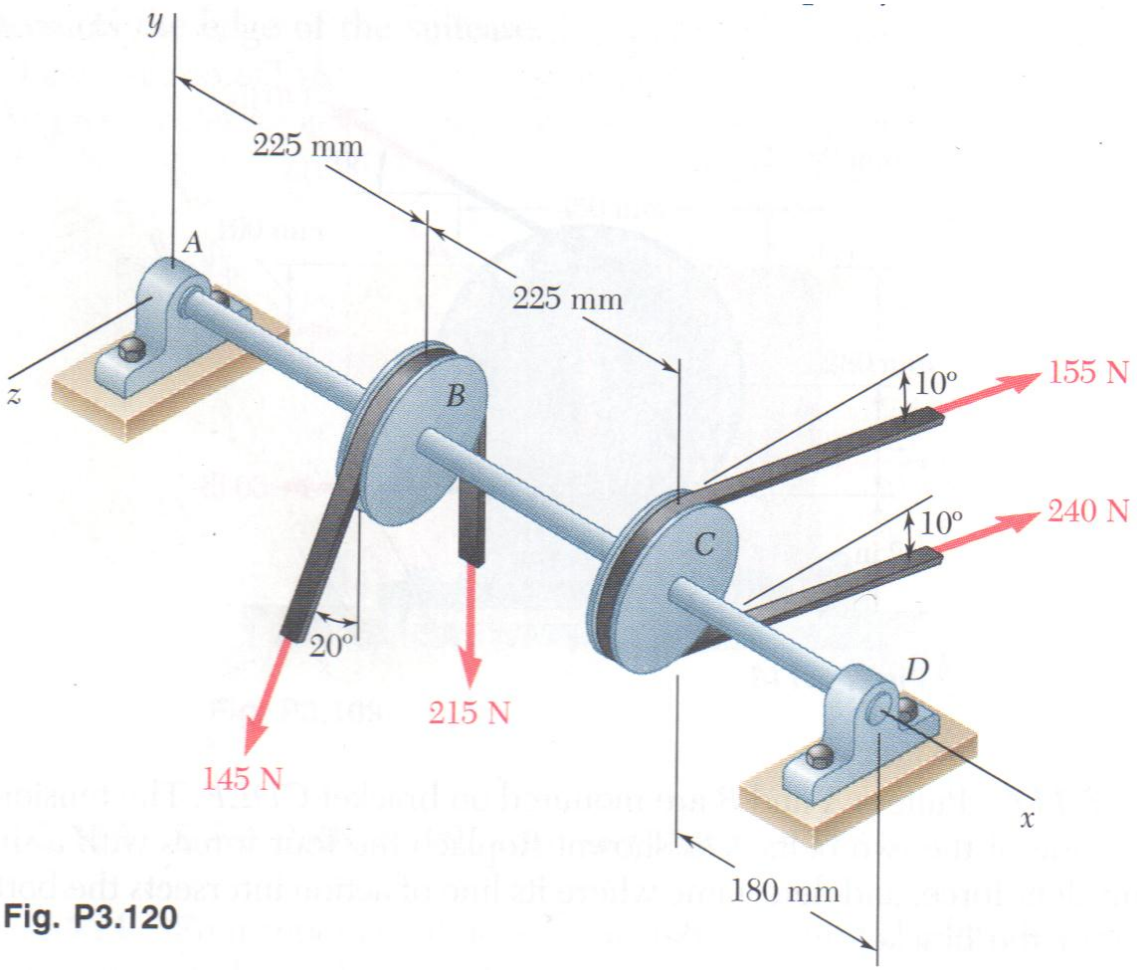

Fig. P3.120