PHY 211 Statics   HW 1
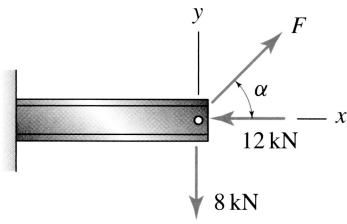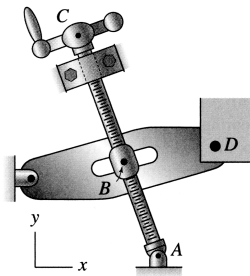
1. The beam to the left is subjected to three forces. If $F =$ 8 kN, determine the value of α that minimizes the resultant of the three forces. Also, find the magnitude of that minimum resultant force.

2. Screw AC is used to position point D. Points A has coordinates (185, 0) mm and point C has coordinates (125, 144) mm, and both are fixed in space. If point B is 52 mm from point A, determine the position vector $\vec{r}_{AB}$ and the coordinates of point B.
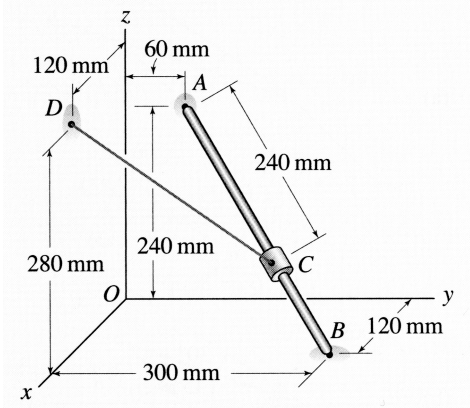
3. The collar C slides on bar AB and is held by cable CD.
   a) Find the coordinates of point C.
   b) If the force in cable CD is 150 N, write a vector expression for the force the cable exerts on point D.
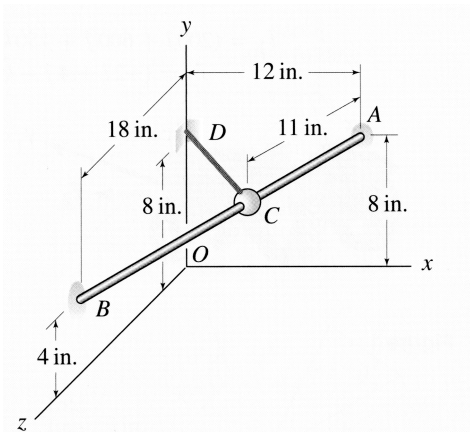
4. Rod AB is straight and has a bead at C. An elastic cord with a tension force of 3 lb is attached between D and C.
   a) Determine the components of the cord force in directions parallel and perpendicular to rod AB.
   b) If the bead is free to slide and is released from the position shown, will it move toward A or toward B?

5. Same figure as 4. What is the smallest distance between D and rod AB?
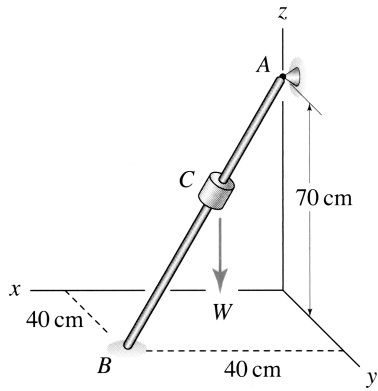
6. The collar C is fixed to rod AB with glue that can withstand a maximum force of 35 N parallel to AB. Determine the weight W of the collar that will just cause the glue bond to break.