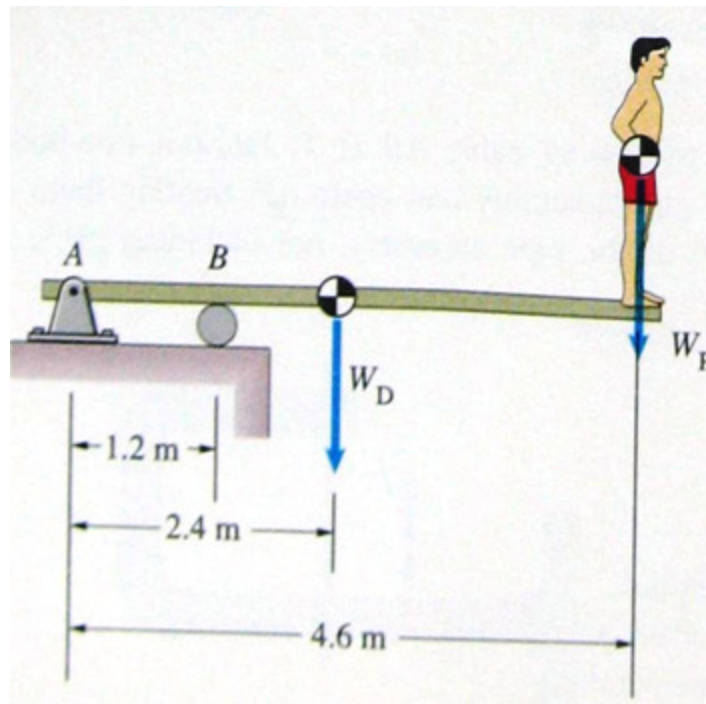


EGBE260: Week 4: Objects and Structures in Equilibrium
Homework

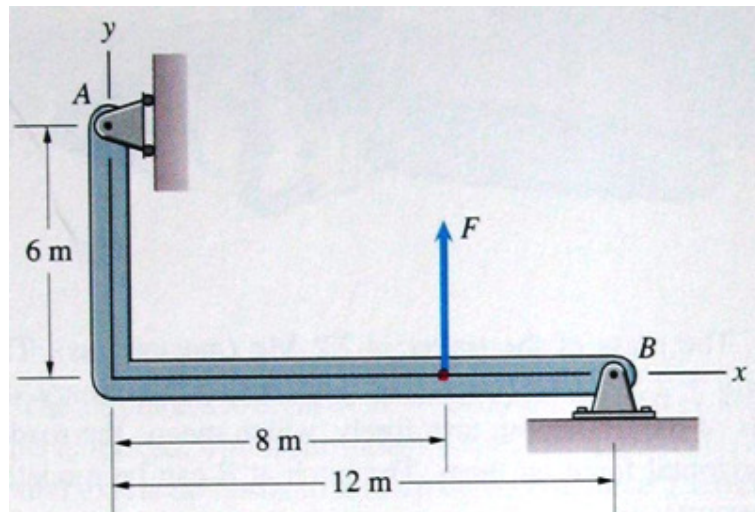
5.6. The mass of the person is 80 kg, and the mass of the diving board is 45 kg. What are the reactions at A and B?

Answer: $A_x=0$, $A_y=-2.67$ kN, $B = 3.89$ kN.



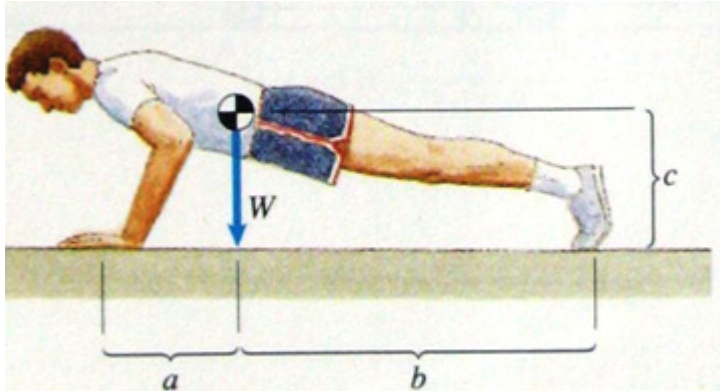
5.14. $F = 40$ kN.
What are the reactions at A and B?

Answer: $A_x=-26.7$ kN, $B_x=-26.7$ kN, $B_y = -40$ kN



5.16. The man weighs 175 lb. $a = 10$ in, $b = 29$ in, and $c = 12$ in. Determine the normal force exerted on the floor:

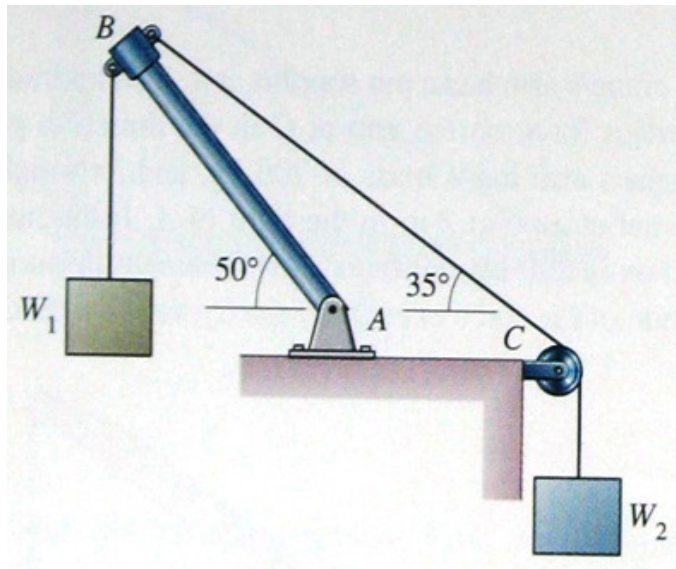
a) by each hand; b) on each foot.



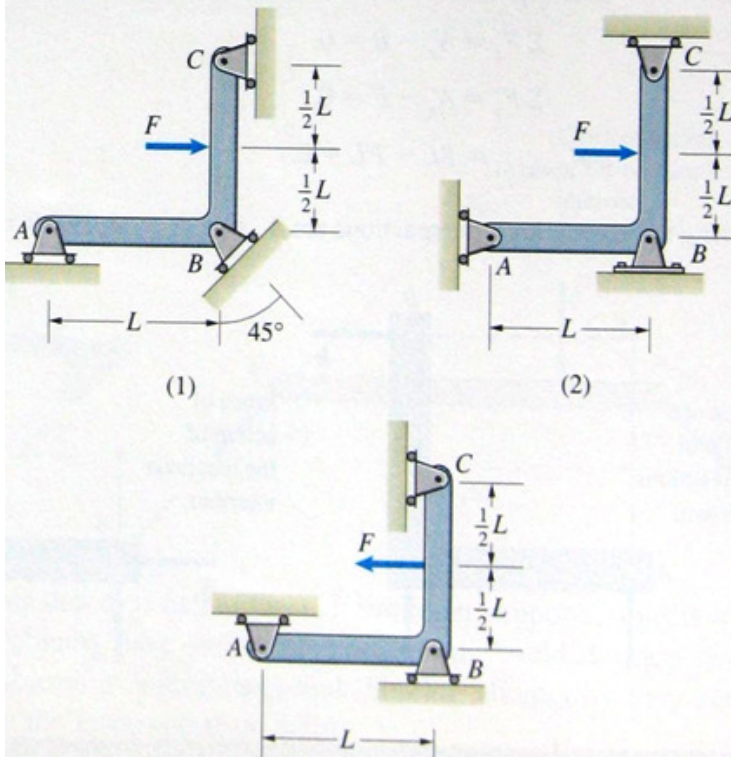
Answer: Each hand: 65.1 lb, Each foot: 22.4 lb

5.60. $W_1 = 1000$ lb. Neglect the weight of bar AB. Determine the weight of W_2 and the reactions at the pin support A.

Answer: $W_2 = 2484$ lb, $A_x = -2034$ lb, $A_y = 2425$ lb.



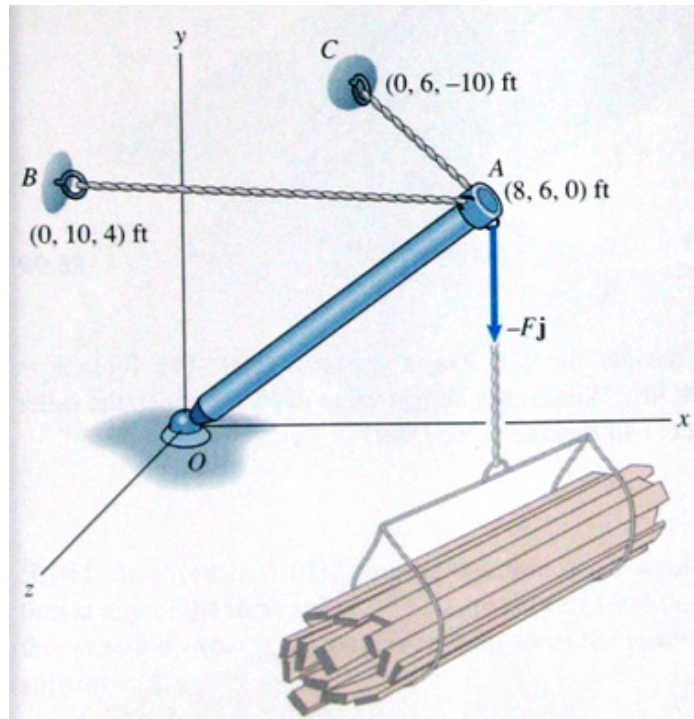
5.76. State whether each of the L-shaped bars is properly or improperly supported. If it is properly supported, determine the reactions at its supports.



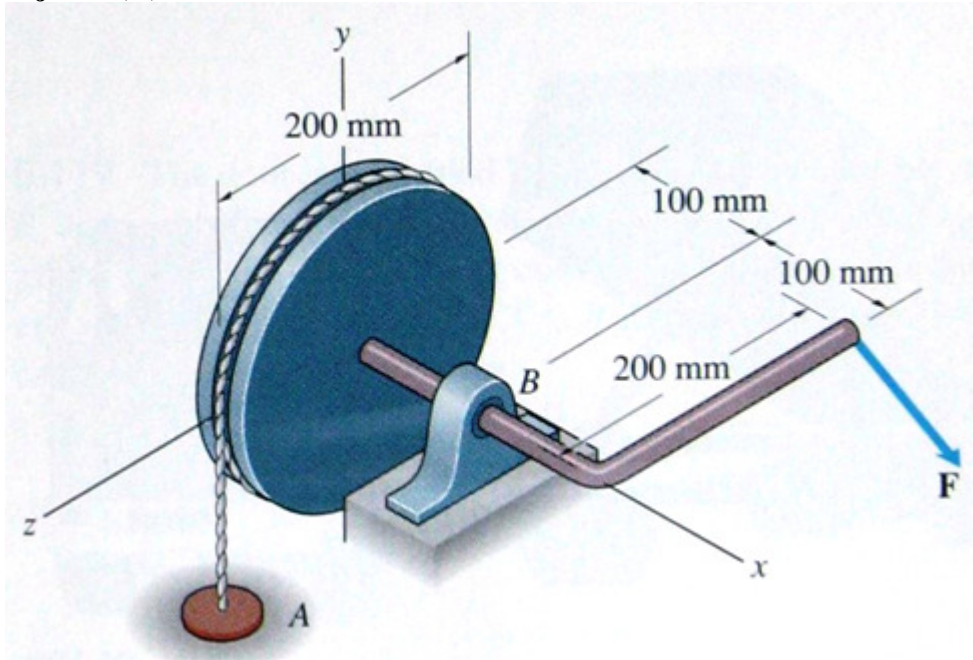
Answer: For (3), reactions are $A=F/2$, $B=F/2$, $C=F$

5.90. The load exerts force $F=600$ lb. Bar OA weighs 200 lb. Determine the tensions in the cables and the reactions at support O .

Answer: $T_{AB}=553$ lb, $T_{AC}=289$ lb, $O_x=632$ lb, $O_y=574$ lb, $O_z=0$

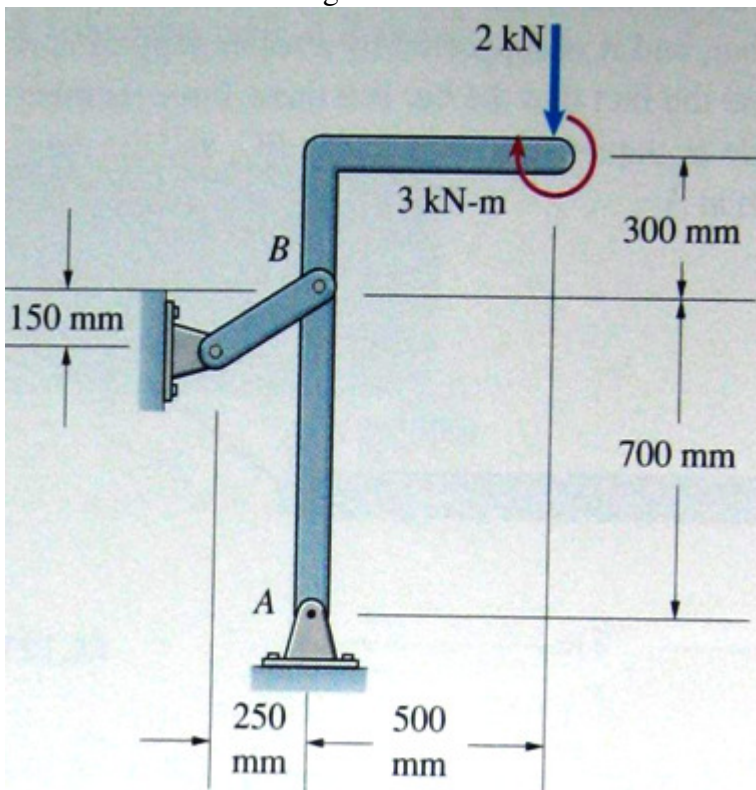


5.106. Determine the tension in the cable and the reactions at bearing B due to the force $F=10i-30j-10k$ (N).



Answer: Tension = 60 N, $B_x = -10$ N, $B_y = 90$ N, $B_z = 10$ N, $M_{By} = 1$ Nm, $M_{Bz} = -3$ Nm.

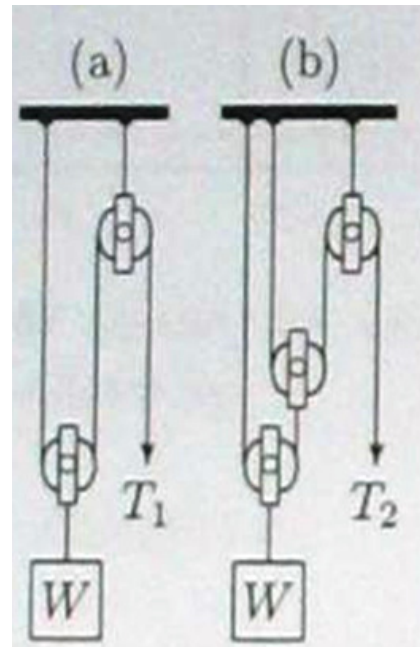
5.128. Determine the magnitudes of the reactions at A and B.



$A = 7.88$ kN, $B = 6.66$ kN

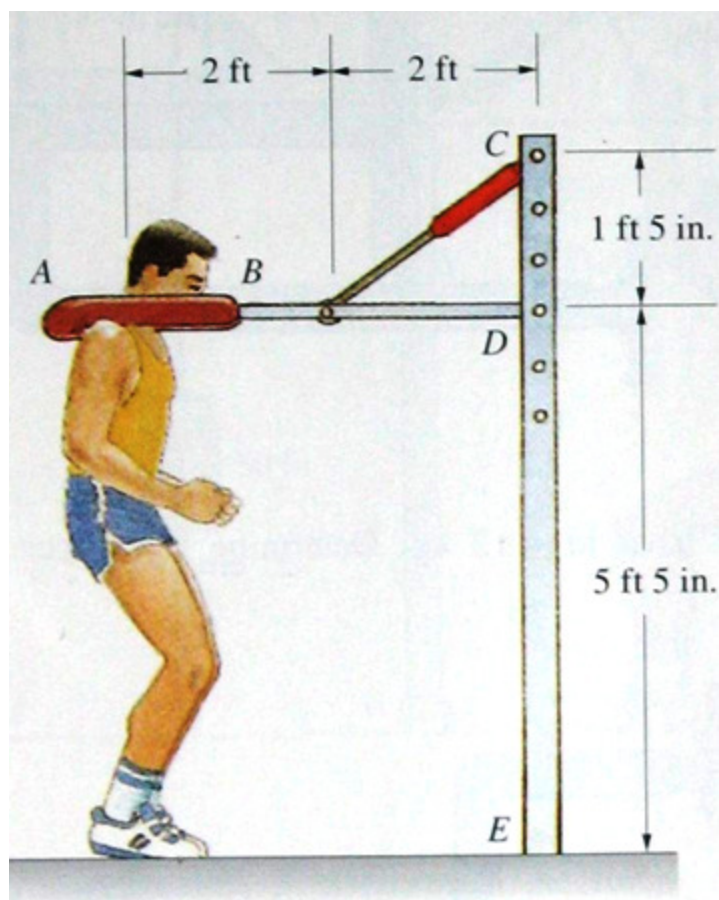
BM 4.4. Using 2 different cable-pulley arrangements, a block of weight W is elevated to a certain height. For each system, determine how much force is applied to the person holding the cable.

Answer: $T_1 = W/2$, $T_2 = W/4$



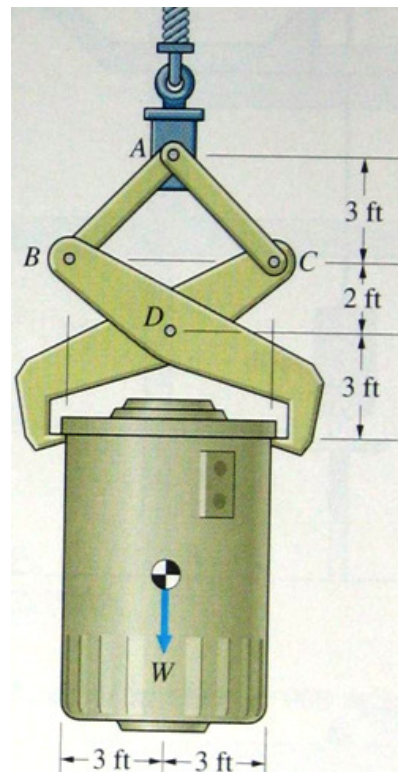
6.78. To rotate bar ABD, the athlete must exert a vertical force at A such that the axial force in BC is 400 lb. What are the reactions on member CDE?

Answer: $C_x = 326 \text{ lb}$, $C_y = 231 \text{ lb}$, $D_x = -326 \text{ lb}$, $D_y = -116 \text{ lb}$, $E_x = 0$, $E_y = -116 \text{ lb}$, $M_E = 462 \text{ ft-lb}$.

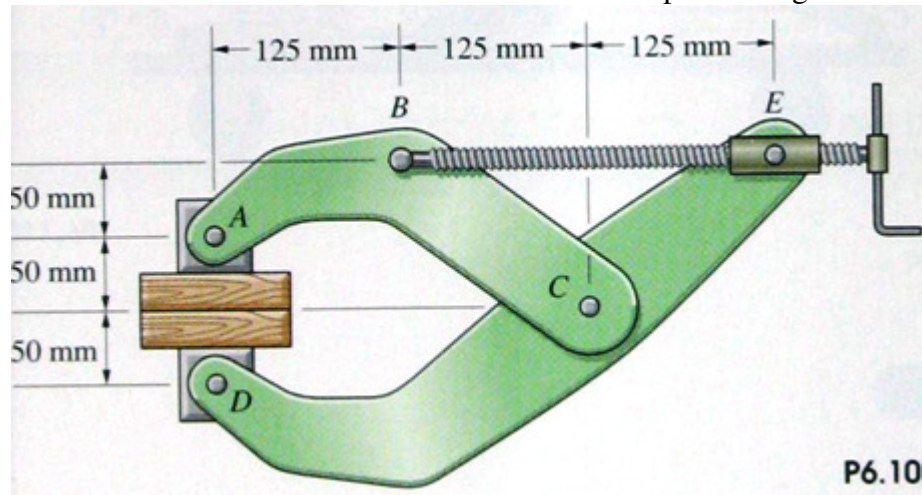


6.98. The weight $W=60$ kip. What is the magnitude of the force the members exert on each other at D ?

Answer: 110 kip.



6.100 The clamp presses 2 blocks of wood together. Determine the magnitude of the force the members exert on each other at C if the blocks are pressed together with a force of 200 N.



Answer: 539 N.