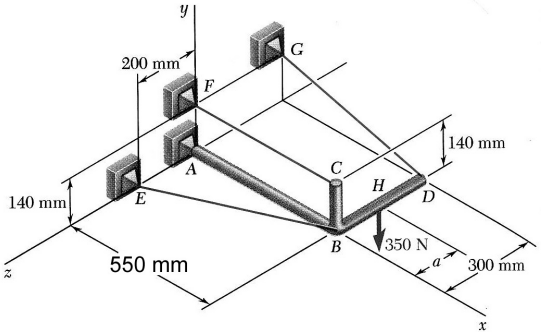
ES201 Problem set #5

(1-2) For the forces and relative positions given, write out the cross product and find the moment about the origin.

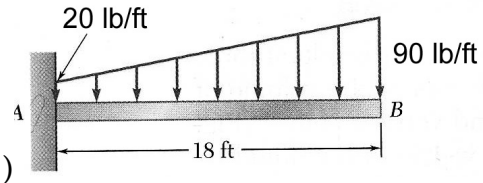
(1): $\overline{F}$ = 25.0 N $\hat{\imath}$ - 10.0 N $\hat{\jmath}$ + 40.0 N $\hat{k}$ $\quad$ $\bar{r}$ = 220mm $\hat{\imath}$ + 105mm $\hat{\jmath}$ + 82.0mm $\hat{k}$

(1): $\overline{F}$ = - 15.0 lb $\hat{\imath}$ + 20.0 lb $\hat{\jmath}$ + 10.0 lb $\hat{k}$ $\quad$ $\bar{r}$ = 72.0 in $\hat{\imath}$ - 10.5 in $\hat{\jmath}$ - 28.0 in $\hat{k}$

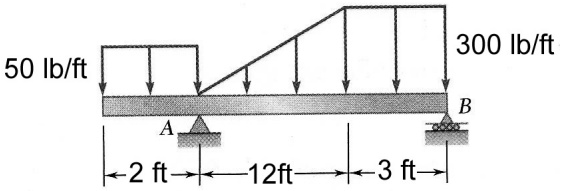
(3) Frame ABCD is supported by a ball-and-socket joint at A and by three cables. Knowing that a 500 N load is applied at D, determine the tension in each cable and the reactions at A. (Note: first draw the free body diagram, including the reaction forces and cable tensions, then solve the static equations $\Sigma F_x = 0$, $\Sigma F_y = 0$, $\Sigma F_z = 0$, $\Sigma M_x = 0$, $\Sigma M_y = 0$, $\Sigma M_z = 0$ for the body!)



(4-5) For the beams and loadings shown, determine (a) the magnitude and location of the resultant of the distributed load, (b) the reactions at the beam supports.

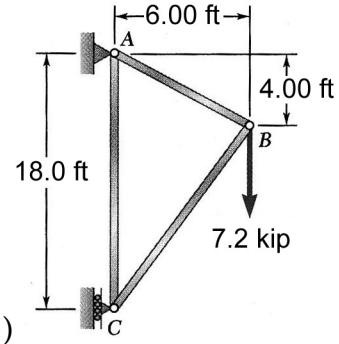


(1)

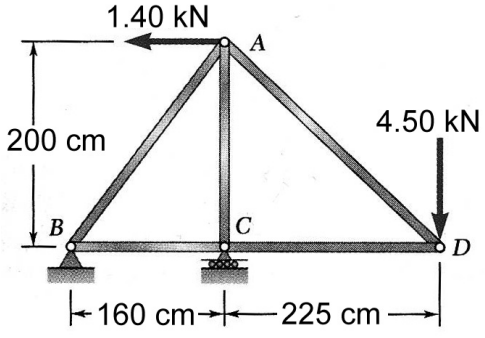


(2)

(6-7) Using the method of joints, determine the force in each member of the truss shown. State whether each member is in tension or compression.



(1)



(2)