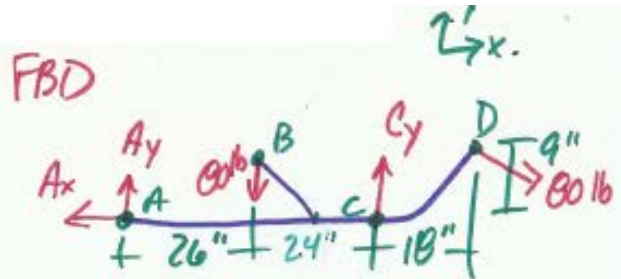
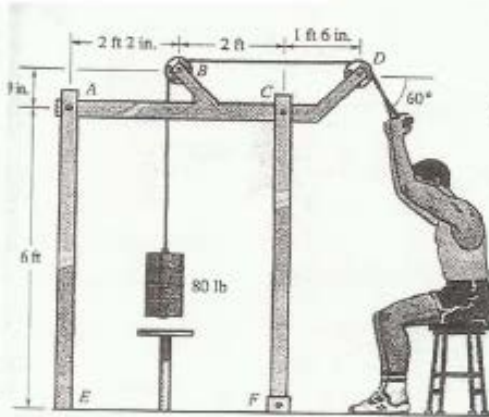


### Problem 3 – Frame I

The man using the exercise machine is holding the 80 lb weight stationary in the position shown. What are the reactions at the built-in support  $E$  and the pin support  $F$ ? ( $A$  and  $C$  are pinned connections).



$$\uparrow \sum M_A = 0 = -26''(80 \text{ lb}) + 50 C_y - 66''(80 \text{ lb} \sin 60^\circ) - 9(80 \text{ lb} \cos 60^\circ)$$

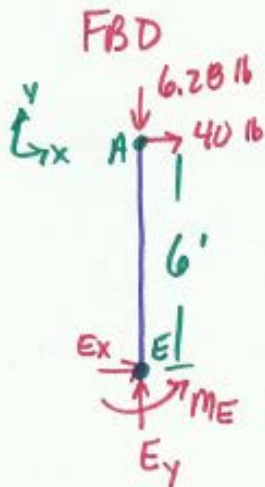
$$C_y = 143 \text{ lb} \uparrow \text{ on ABCD}$$

$$A_y = 6.28 \text{ lbs} \uparrow \text{ on ABCD}$$

$$A_x = 40 \text{ lb} \leftarrow \text{ on ABCD}$$

$$\uparrow \sum F_y = 0 = A_y - 80 + C_y - 80 \sin 60^\circ$$

$$\rightarrow \sum F_x = 0 = 80 \cos 60^\circ - A_x$$



$$\rightarrow \sum F_x = 0 = 40 + E_x$$

$$\uparrow \sum F_y = 0 = -6.28 + E_y$$

$$\curvearrowright \sum M_E = 0 = 40 \text{ lb}(6') - M_E$$

$$E_x = -40 = 40 \text{ lbs} \leftarrow$$

$$E_y = 6.28 \text{ lbs} \uparrow$$

$$M_E = 240 \text{ Ft} \cdot \text{lbs} \curvearrowright$$



TWO FORCE MEMBER!

$$\uparrow \sum F_y = 0 = -143 + F_y$$

$$F_y = 143 \text{ lbs} \uparrow$$