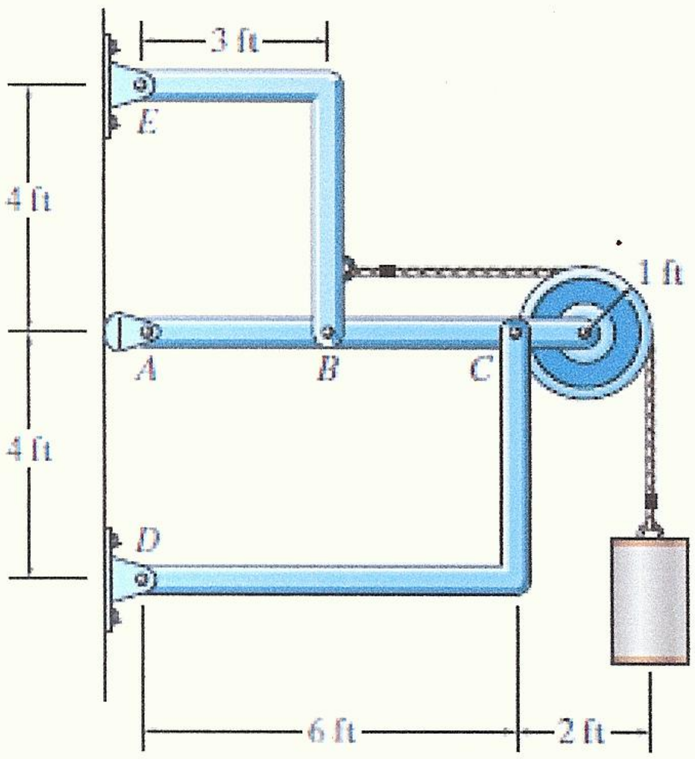
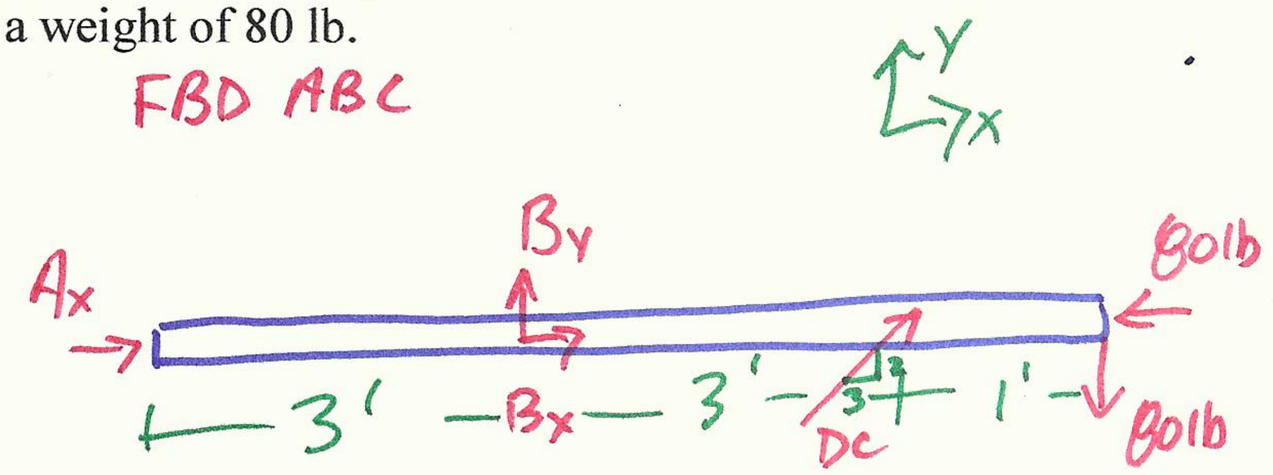
Problem 1 - Frames II

Determine the horizontal and vertical components of force at pins *D* and *E* and the force on the short link at *A*. The suspended cylinder has a weight of 80 lb.



FBD ABC



NON CONCURRENT
3 EQNS
5 UNKS

$\circlearrowleft \Sigma M_B = 0$

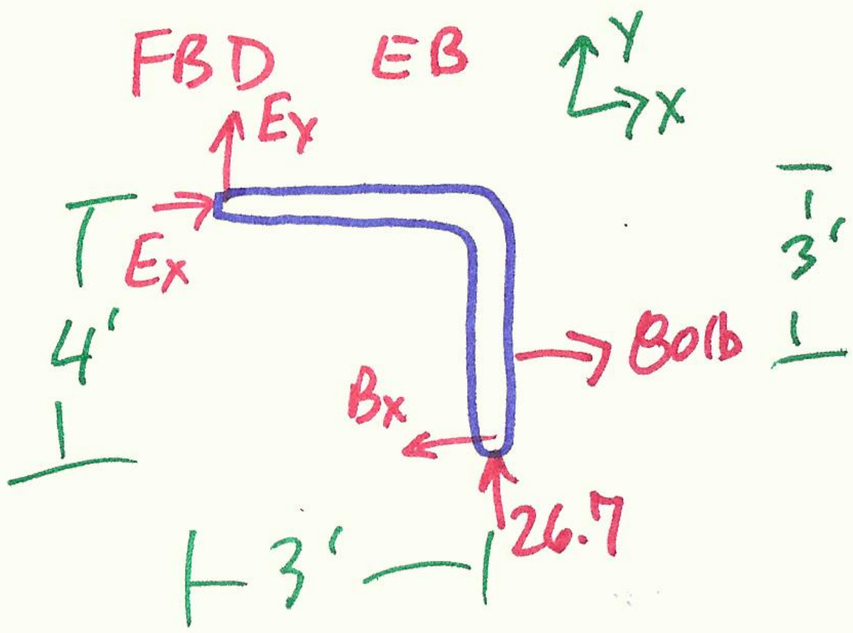
$-3DC\frac{2}{\sqrt{13}} + 4(80) = 0$ $\quad DC = 192 \text{ lbs} \swarrow \frac{2}{3}$ ON ABC

$\uparrow \Sigma F_y = 0$

$B_y + \frac{2}{\sqrt{13}} DC - 80 = 0$ $\quad B_y = -26.7$

$B_y = 26.7 \text{ lbs} \downarrow$

FBD EB



$\circlearrowleft \Sigma M_E = 0$

$-26.7(3) + 4B_x - 3(80) = 0$ $\quad B_x = 80 \text{ lb} \leftarrow$ ON BE

NON CONCURRENT
3 EQNS, 3 UNKS

$\rightarrow \Sigma F_x = 0$

$E_x - B_x + 80 = 0$ $\quad E_x = 0$

$\uparrow \Sigma F_y = 0$

$E_x + 26.7 = 0$ $\quad E_y = -26.7$

$E_y = 26.7 \text{ lb} \downarrow$ ON BE

ΣF_x ON FIRST FBD

$A_x + B_x + \frac{3}{\sqrt{13}} DC - 80 = 0$

$A_x = -160$

$A_x = 160 \text{ lb} \leftarrow$ ON ABC