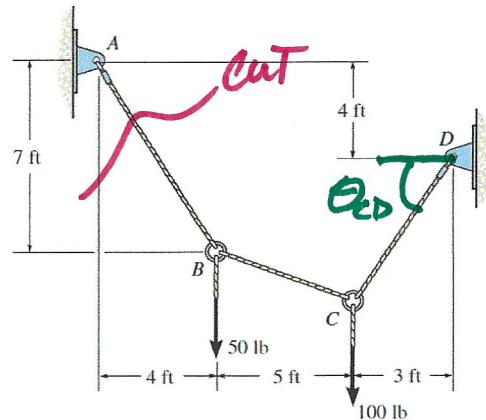
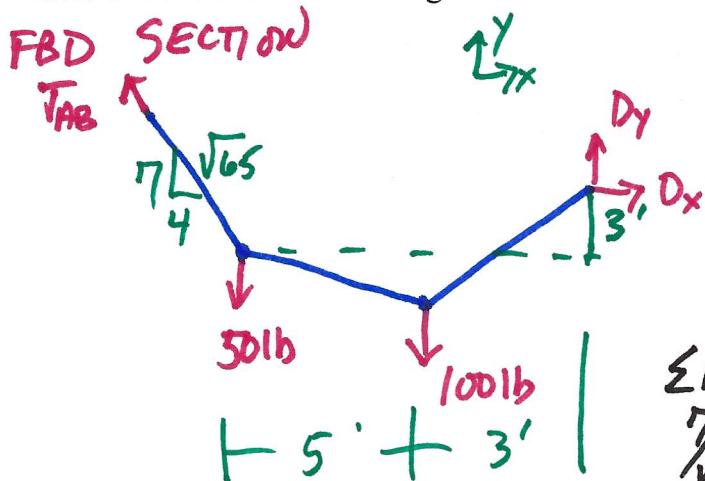


Problem 16: Determine the tension in each segment of the cable and the cable's total length.



$$\sum M_D = 0$$

$$\frac{7}{\sqrt{65}} T_{AB}(B) + \frac{4}{\sqrt{65}} (T_{AB})(3) - 50(B) - 100(3) = 0$$

$$\underline{\underline{T_{AB} = 83 \text{ lbs}}}$$

$$\sum F_x = 0$$

$$-\frac{4}{\sqrt{65}}(83) + D_x = 0 \quad D_x = 41.2 \text{ lbs} \rightarrow$$

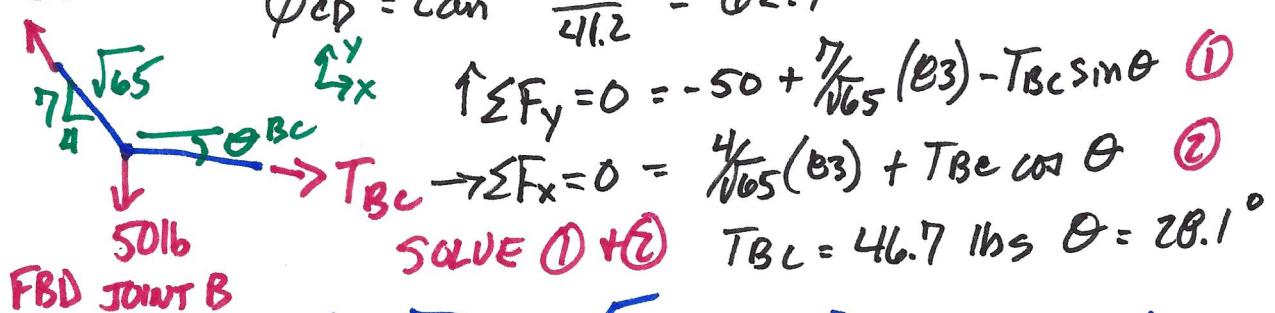
$$\sum F_y = 0$$

$$\frac{7}{\sqrt{65}}(83) - 50 - 100 + D_y = 0 \quad D_y = 77.9 \text{ lbs}$$

$$T_{CD} = \sqrt{D_x^2 + D_y^2} = \sqrt{41.2^2 + 77.9^2} = \underline{\underline{88.2 \text{ lbs}}}$$

$$83 \text{ lbs}$$

$$\phi_{CD} = \tan^{-1} \frac{77.9}{41.2} = 62.1^\circ$$



$$l = \sqrt{65} + \frac{5}{\cos 28.1^\circ} + \frac{3}{\cos 62.1^\circ} = 20.2'$$

ANSWER: $T_{AB} = 83 \text{ lbs}$ $\angle 7/4$ $T_{BC} = 46.7 \text{ lbs}$ $\angle 28.1^\circ$ $T_{CD} = 88.2 \text{ lbs}$ $\angle 62.1^\circ$
 Length = 20.2 feet