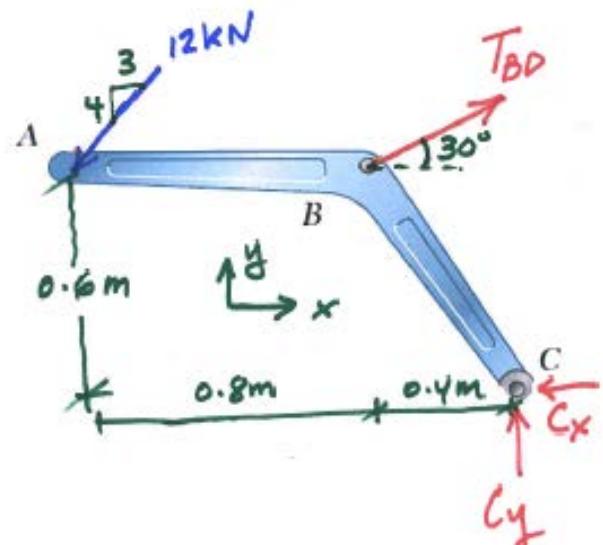
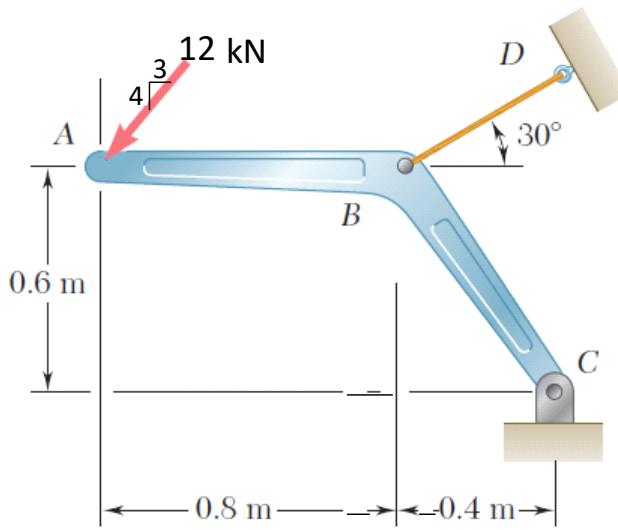


# EGM 3420C - Engineering Mechanics

## Statics Review 1 Problems

### Problem 7

- a. Draw a complete Free Body Diagram of the body ABC below. Draw on the body to the right.



- b. Determine all unknown reactions at support C and the Force in the cable BD.

$$\begin{aligned} \text{At } C: \sum M_C = 0 &= 12\left(\frac{3}{5}\right)(0.6) + 12\left(\frac{4}{5}\right)(1.2) - T_{BD}(\cos 30)(0.6) - T_{BD}(\sin 30)(0.4) \\ 0 &= 15.84 - 0.7196 T_{BD} \Rightarrow T_{BD} = \underline{\underline{22.0 \text{ kN}}} \quad (\text{T}) \end{aligned}$$

$$\rightarrow \sum F_x = 0 = -12\left(\frac{3}{5}\right) + T_{BD} \cos 30 - C_x \Rightarrow C_x = \underline{\underline{11.85 \text{ kN}}} \leftarrow$$

$$\uparrow \sum F_y = 0 = -12\left(\frac{4}{5}\right) + T_{BD} \sin 30 + C_y \Rightarrow C_y = \underline{\underline{-1.400 \text{ kN}}} \quad \text{or} \quad C_y = \underline{\underline{1.400 \text{ kN}}} \downarrow$$

Check

$$\begin{aligned} \text{At } A: \sum M_A &= T_{BD}(\sin 30)(0.8) + C_y(1.2) - C_x(0.6) \\ &= \underline{\underline{8.8}} - \underline{\underline{1.68}} - \underline{\underline{7.11}} \\ &= \underline{\underline{8.8}} - \underline{\underline{8.8}} = 0 \quad \underline{\underline{0 \text{ kN}}} \end{aligned}$$

**ANSWER:**

$$T_{BD} = \underline{\underline{22.0 \text{ kN}}} \quad (\text{T}) ; C_x = \underline{\underline{11.85 \text{ kN}}} \leftarrow ; C_y = \underline{\underline{1.400 \text{ kN}}} \downarrow$$

