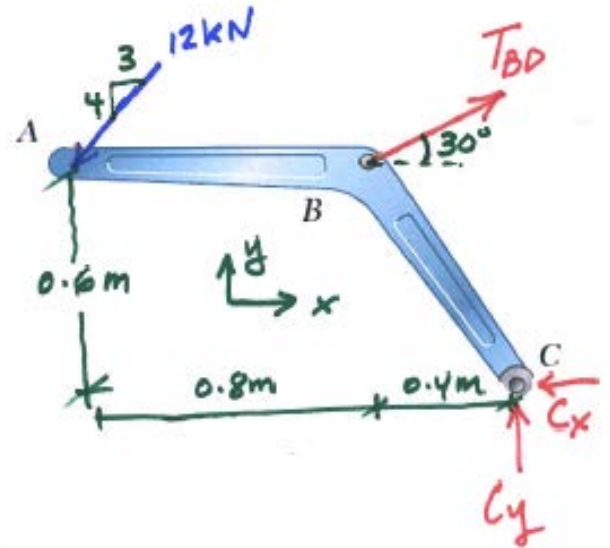
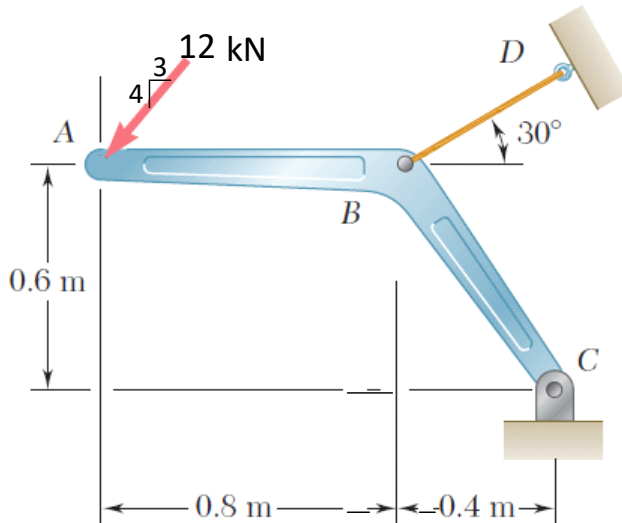


# EGM 3420C - Engineering Mechanics

## 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.

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

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

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

$$C_y = \underline{\underline{1.400 \text{ kN} \downarrow}}$$

Check

$$\begin{aligned} \downarrow \Sigma M_A &= T_{BD}(\sin 30)(0.8) + C_y(1.2) - C_x(0.6) \\ &= 8.8 - 1.68 - 7.11 \\ &= 8.8 - 8.8 = 0 \quad \underline{\underline{0 \text{ k}}}. \end{aligned}$$

ANSWER:

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

