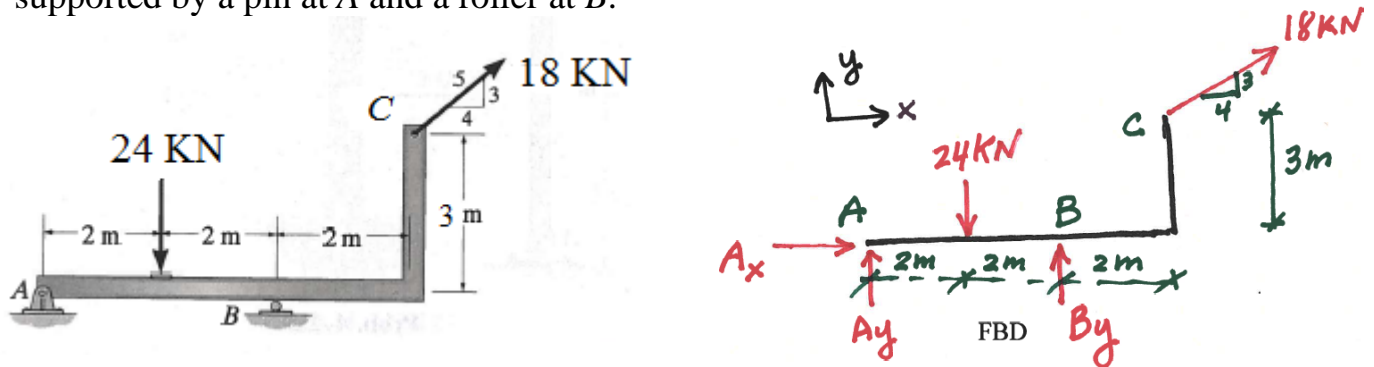


EGM 3420C - Engineering Mechanics

Statics Review 1 Problems

Problem 4

- a. For the loadings shown, draw the complete free body diagram of member ABC supported by a pin at A and a roller at B.



FBD

- b. Determine the reactions at supports A and B.

$$\begin{aligned} \sum M_A = 0 &= 24(2) - B_y(4) + 18\left(\frac{4}{5}\right)(3) - 18\left(\frac{3}{5}\right)(6) \\ 0 &= 48 - 4B_y + 43.2 - 64.8 \\ 4B_y &= 26.4 \Rightarrow B_y = 6.60 \text{ kN} \uparrow \end{aligned}$$

$$\begin{aligned} \sum F_y = 0 &= A_y - 24 + B_y + 18\left(\frac{3}{5}\right) \\ A_y &= 24 - 6.60 - 10.8 \Rightarrow A_y = 6.60 \text{ kN} \uparrow \end{aligned}$$

$$\sum F_x = 0 = A_x + 18\left(\frac{4}{5}\right) \Rightarrow A_x = -14.4 = 14.40 \text{ kN} \leftarrow$$

$$\begin{aligned} \text{Check } \sum M_B = 0 &= A_y(4) - 24(2) + 18\left(\frac{4}{5}\right)(3) - 18\left(\frac{3}{5}\right)(2) \\ 4A_y &= 48 - 43.2 + 21.6 = 26.4 \end{aligned}$$

$$A_y = 6.60 \text{ kN} \uparrow \text{ same answer O.K.}$$

ANSWER:

$$A_x = 14.40 \text{ kN} \leftarrow \quad A_y = 6.60 \text{ kN} \uparrow \quad B_y = 6.60 \text{ kN} \uparrow$$