

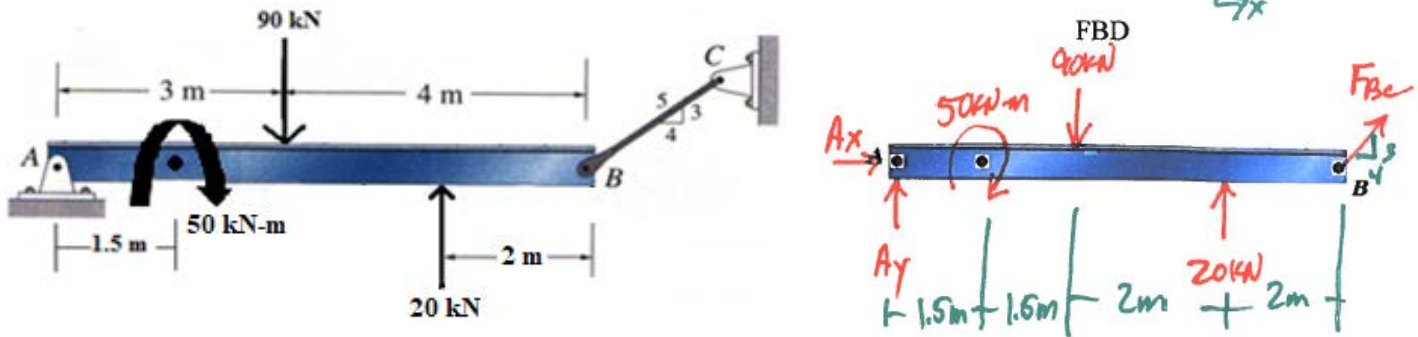
EGM 3420C - Engineering Mechanics

Statics Review 1 Problems

Problem 1

- a. Draw a complete Free Body Diagram of the body AB below.

Note: Member BC is pinned at both ends.



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

$$\begin{aligned} \sum M_A &= 0 \\ 50 \text{ kN}\cdot\text{m} + 3 \text{ m}(90 \text{ kN}) - 5 \text{ m}(20 \text{ kN}) - \frac{3}{5} F_{BC}(7 \text{ m}) &= 0 \\ 50 + 270 - 100 - 4.2 F_{BC} &= 0 \\ F_{BC} &= 52.4 \text{ kN} \uparrow \end{aligned}$$

$$\begin{aligned} \sum F_x &= 0 \\ A_x + \frac{4}{5} F_{BC} &= 0 \\ A_x + \frac{4}{5}(52.4) &= 0 \\ A_x &= -41.9 = 41.9 \text{ kN} \leftarrow \end{aligned}$$

$$\begin{aligned} \sum F_y &= 0 \\ A_y - 90 + 20 + \frac{3}{5}(52.4) &= 0 \\ A_y &= 38.6 \text{ kN} \uparrow \end{aligned}$$

ANSWER:

$$F_{BC} = 52.4 \text{ kN} \uparrow, A_x = 41.9 \text{ kN} \leftarrow, A_y = 38.6 \text{ kN} \uparrow$$