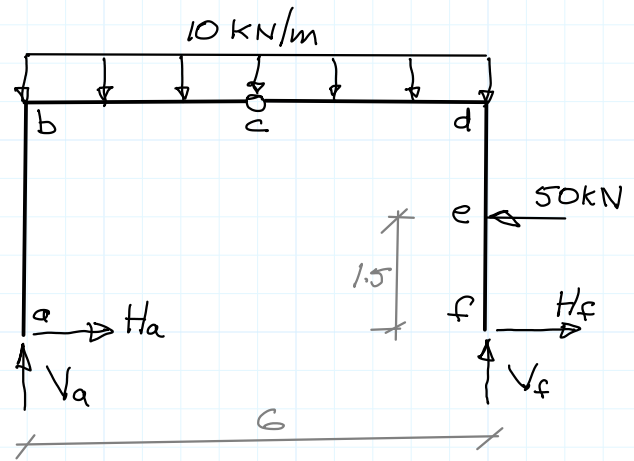
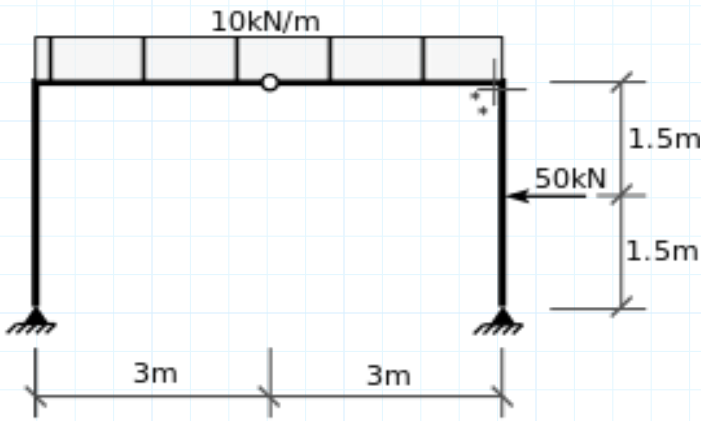


Prob 2.7-1



FBD-1

From FBD-1

$$\sum M_f = 0 \quad (+\curvearrowright)$$

$$-V_a \times 6 + 10 \times 6 \times 3 + 50 \times 1.5 = 0$$

$$\underline{V_a = 42.5 \quad (\uparrow)}$$

$$\sum M_a = 0 \quad (+\curvearrowright)$$

$$-10 \times 6 \times 3 + 50 \times 1.5 + V_f \times 6 = 0$$

$$\underline{V_f = 17.5 \quad (\uparrow)}$$

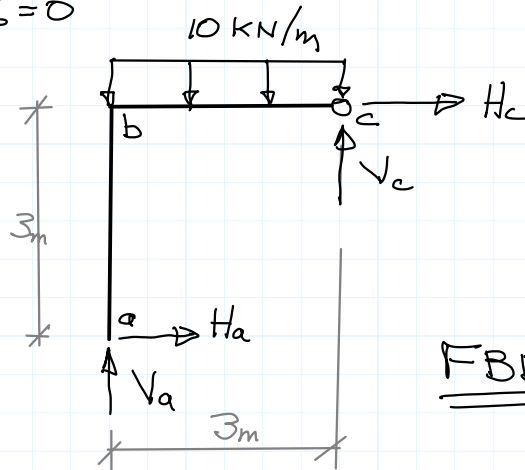
From FBD-2:

$$\sum M_c = 0 \quad (+\curvearrowright)$$

$$-V_a \times 3 + H_a \times 3 + 10 \times 3 \times 1.5 = 0$$

$$-42.5 \times 3 + H_a \times 3 + 45 = 0$$

$$\underline{H_a = 27.5 \text{ kN} \quad (\rightarrow)}$$



FBD-2

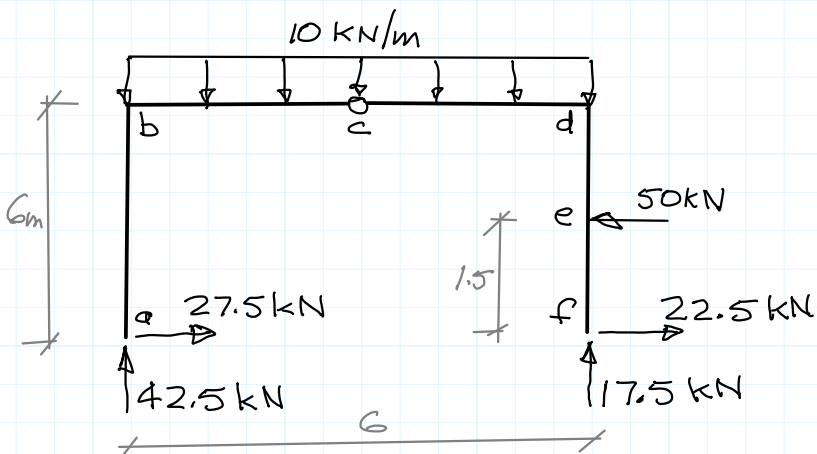
From FBD-1:

$$\sum F_x = 0 \quad \rightarrow$$

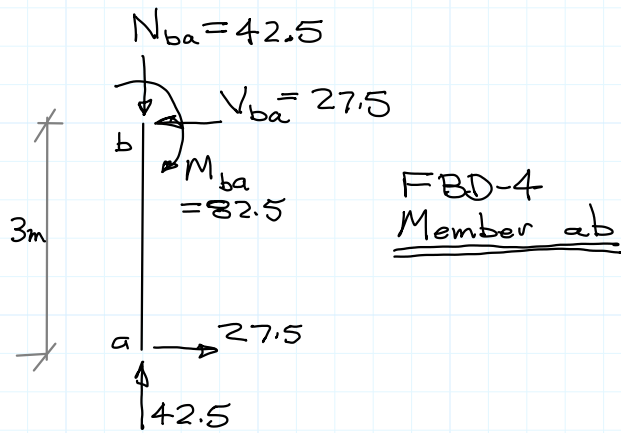
$$H_a + H_f - 50 = 0$$

$$27.5 + H_f - 50 = 0$$

$$\underline{H_f = 22.5 \text{ kN} \quad (\rightarrow)}$$



FBD-3: Summary



$$\sum F_x = 0 \rightarrow$$

$$-V_{ba} + 27.5 = 0$$

$$V_{ba} = 27.5 \quad (\therefore \leftarrow)$$

$$\sum F_y = 0 \uparrow$$

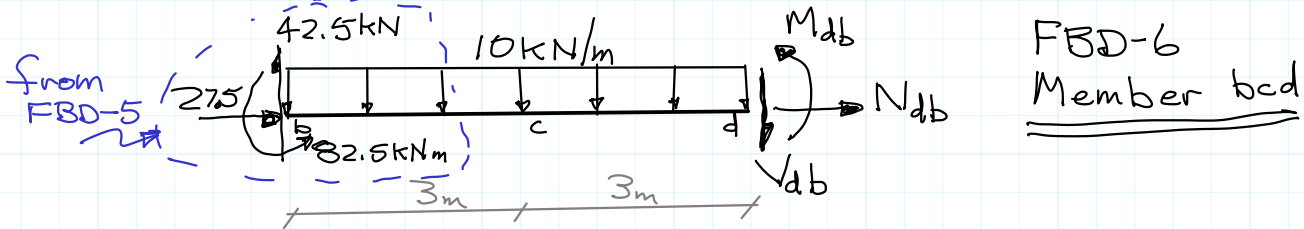
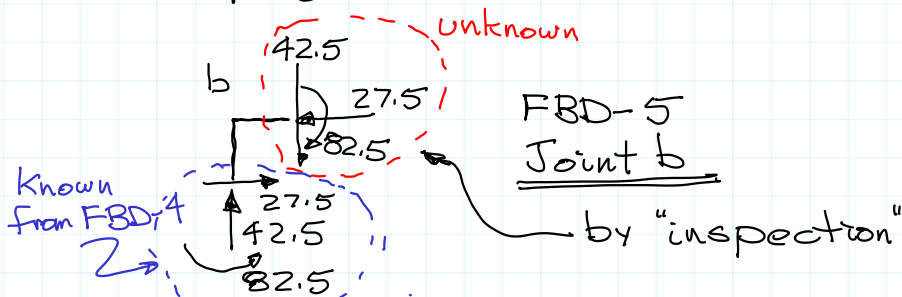
$$-N_{ba} + 42.5 = 0$$

$$N_{ba} = 42.5 \quad (\therefore \uparrow)$$

$$\sum M_b \odot$$

$$-M_{ba} + 27.5 \times 3 = 0$$

$$M_{ba} = 82.5 \text{ kN-m}$$



From FBD-6:

$$\sum F_x = 0 \rightarrow$$

$$27.5 + N_{db} = 0$$

$$N_{db} = -27.5 \quad (\therefore \leftarrow) \quad (\therefore \ominus)$$

$$\sum F_y = 0 \uparrow$$

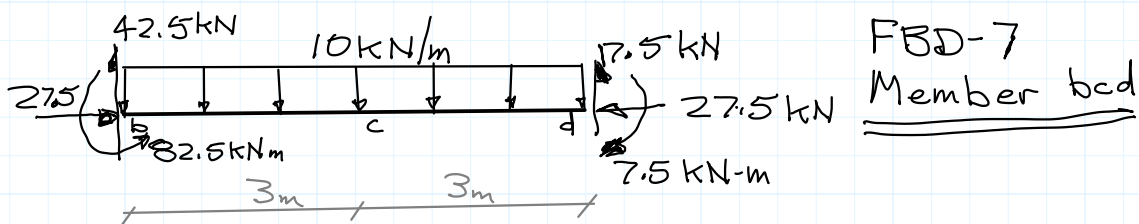
$$42.5 - 10 \times 6 - V_{db} = 0$$

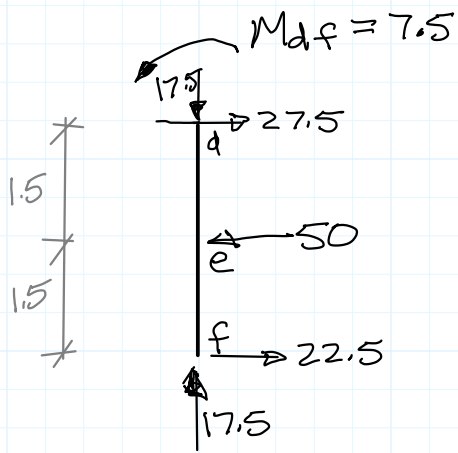
$$V_{db} = -17.5 \quad (\therefore \uparrow)$$

$$\sum M_d = 0 \odot$$

$$82.5 - 42.5 \times 6 + 10 \times 6 \times 3 + M_{db} = 0$$

$$M_{db} = -7.5 \quad (\therefore \ominus)$$





FBD-8
member def

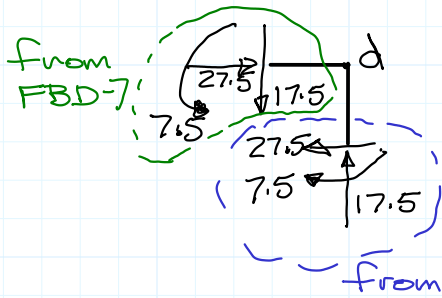
$$N_{df} = 17.5 \quad \text{by inspection}$$

$$V_{df} = 50 - 22.5 = 27.5 \quad \text{by inspection}$$

$$\sum M_d = 0 \quad (+\curvearrowright)$$

$$M_{df} + 22.5 \times 3 - 50 \times 1.5 = 0$$

$$M_{df} = 7.5 \quad (+\curvearrowright)$$



FBD-9
joint d

$$\sum M (+\curvearrowright) = +7.5 - 7.5 = 0$$

$$\sum F_y (+\uparrow) = +17.5 - 17.5 = 0$$

$$\sum F_x (+\rightarrow) = -27.5 + 27.5 = 0$$

\therefore joint is in equilibrium.

That is a good thing.