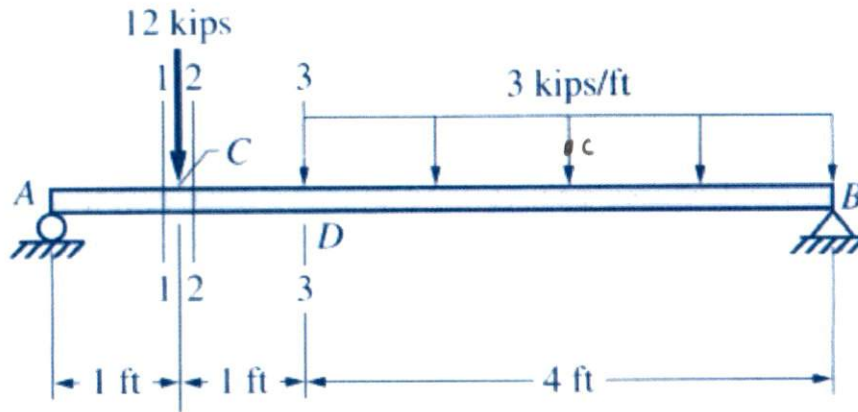


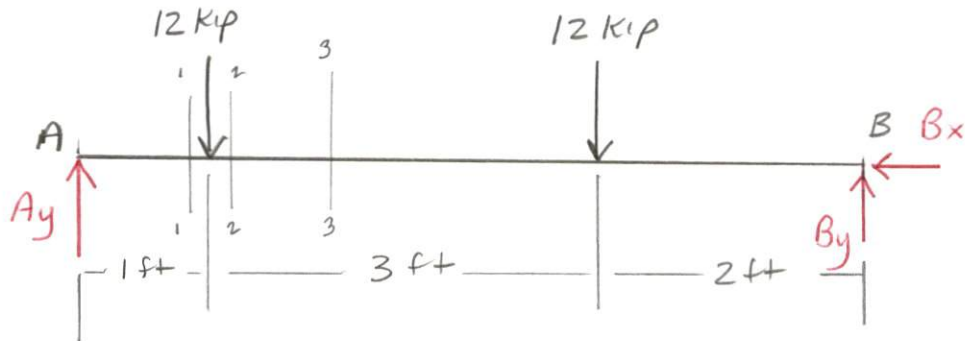
13-10

Refer to Figs. P13-7 to P13-12. Use the rules for finding shear forces and bending moments to determine the shear forces and bending moments in each figure at sections 1-1, 2-2, and 3-3.



Solution.

Determine the reactions at the supports A and B.



FBD

Equilibrium Equations

ccw + M ↺
cw - M ↻

$$[\sum F_x = 0] \quad B_x = 0$$

$$[\sum M_B = 0] \quad - A_y(6 \text{ ft}) + 12 \text{ kip}(5 \text{ ft}) + 12 \text{ kip}(2 \text{ ft}) = 0$$

$$A_y = \frac{84 \text{ kip}\cdot\text{ft}}{6 \text{ ft}} = 14 \text{ kip} \uparrow$$

$$[\sum F_y = 0] \quad A_y - 12 \text{ kip} - 12 \text{ kip} + B_y = 0$$

$$B_y = 24 \text{ kip} - 14 \text{ kip} = 10 \text{ kip} \uparrow$$

Determine the Shear

$V = \Sigma \text{EXT Forces from left}$

$$V_{C-} = V_{1-1} = +14 \text{ Kip}$$

$$V_{C+} = V_{2-2} = 14 \text{ Kip} - 12 \text{ Kip} = +2 \text{ Kip}$$

$$V_D = 14 \text{ Kip} - 12 \text{ Kip} = +2 \text{ Kip}$$

Determine the bending Moment

$$M_{1-1} = M_{2-2} = M_C = 14 \text{ Kip} (1 \text{ ft}) = +14 \text{ Kip}\cdot\text{ft}$$

$$M_D = 14 \text{ Kip} (2 \text{ ft}) - 12 \text{ Kip} (1 \text{ ft}) = 28 \text{ Kip}\cdot\text{ft} - 12 \text{ Kip}\cdot\text{ft} \\ = +16 \text{ Kip}\cdot\text{ft}$$