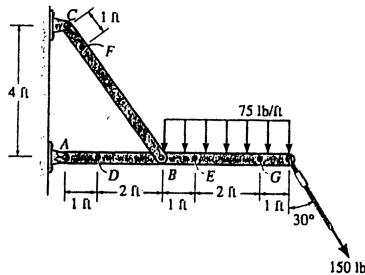


1-10 Determine the resultant internal loadings acting on the cross sections through points *D* and *E* of the frame.



Member *AG* :

$$\left( + \sum M_A = 0; \quad \frac{4}{5} F_{BC} (3) - 75(4)(5) - 150 \cos 30^\circ (7) = 0; \quad F_{BC} = 1003.89 \text{ lb} \right.$$

$$\left( + \sum M_B = 0; \quad A_y (3) - 75(4)(2) - 150 \cos 30^\circ (4) = 0; \quad A_y = 373.20 \text{ lb} \right.$$

$$\rightarrow \sum F_x = 0; \quad A_x - \frac{3}{5} (1003.89) + 150 \sin 30^\circ = 0; \quad A_x = 527.33 \text{ lb}$$

For point *D* :

$$\rightarrow \sum F_x = 0; \quad N_D + 527.33 = 0$$

$$N_D = -527 \text{ lb}$$

Ans

$$+ \uparrow \sum F_y = 0; \quad -373.20 - V_D = 0$$

$$V_D = -373 \text{ lb}$$

Ans

$$\left( + \sum M_D = 0; \quad M_D + 373.20(1) = 0 \right.$$

$$M_D = -373 \text{ lb} \cdot \text{ft}$$

Ans

For point *E* :

$$\rightarrow \sum F_x = 0; \quad 150 \sin 30^\circ - N_E = 0$$

$$N_E = 75.0 \text{ lb}$$

Ans

$$+ \uparrow \sum F_y = 0; \quad V_E - 75(3) - 150 \cos 30^\circ = 0$$

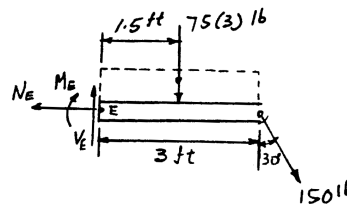
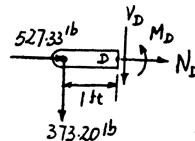
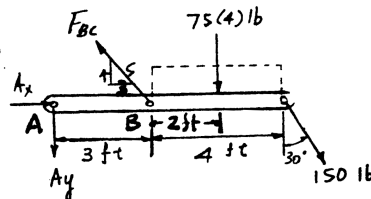
$$V_E = 355 \text{ lb}$$

Ans

$$\left( + \sum M_E = 0; \quad -M_E - 75(3)(1.5) - 150 \cos 30^\circ (3) = 0; \right.$$

$$M_E = -727 \text{ lb} \cdot \text{ft}$$

Ans



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