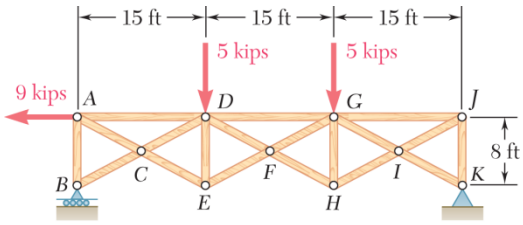
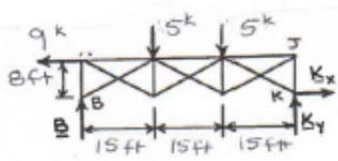


PROBLEM 6.60

Determine the force in members *DG*, *FG*, and *FH* of the truss shown.

SOLUTION

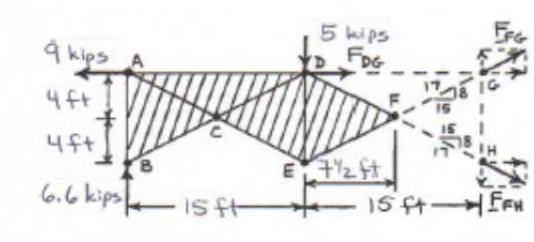
Reactions:



$+\circlearrowleft \Sigma M_k = 0$: $\quad 9\ \text{kips}(8\ \text{ft}) - B(45\ \text{ft}) + 5\ \text{kips}(30\ \text{ft}) + 5\ \text{kips}(15\ \text{ft}) = 0 \quad \mathbf{B} = 6.6\ \text{kips} \uparrow$

$\overset{+}{\rightarrow} \Sigma F_x = 0$: $\quad -9\ \text{kips} + K_x = 0 \qquad \mathbf{K}_x = 9\ \text{kips} \rightarrow$

$+\uparrow \Sigma F_y = 0$: $\quad 6.6\ \text{kips} - 5\ \text{kips} - 5\ \text{kips} + K_y = 0 \quad \mathbf{K}_y = 3.4\ \text{kips} \uparrow$



$+\circlearrowleft \Sigma M_F = 0$: $\quad 9\ \text{kips}(4\ \text{ft}) - 6.6\ \text{kips}(22.5\ \text{ft}) + 5\ \text{kips}(7.5\ \text{ft}) - F_{DG}(4\ \text{ft}) = 0$

$F_{DG} = -18.75\ \text{kips} \qquad F_{DG} = 18.75\ \text{kips} \quad C \blacktriangleleft$

$+\circlearrowleft \Sigma M_D = 0$: $\quad -6.6\ \text{kips}(15\ \text{ft}) + \left(\frac{8}{17} F_{FG}\right)(15\ \text{ft}) = 0$

$F_{FG} = +14.025\ \text{kips} \qquad F_{FG} = 14.03\ \text{kips} \quad T \blacktriangleleft$

$+\circlearrowleft \Sigma M_G = 0$: $\quad 5\ \text{kips}(15\ \text{ft}) - 6.6\ \text{kips}(30\ \text{ft}) + \left(\frac{15}{17} F_{FH}\right)(8\ \text{ft}) = 0$

$F_{FH} = +17.425\ \text{kips} \qquad F_{FH} = 17.43\ \text{kips} \quad T \blacktriangleleft$