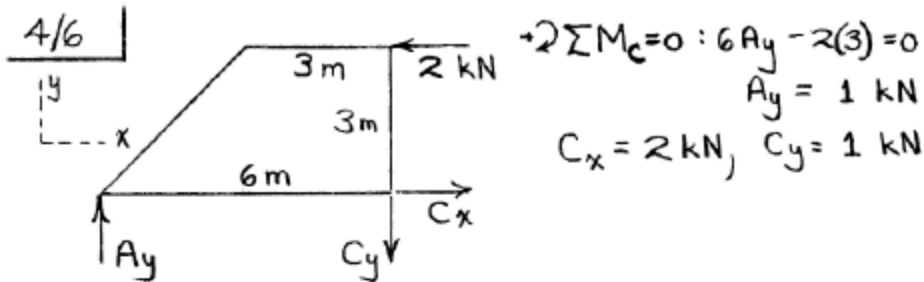


E36 Spring 2005  
 Homework 5 Solutions  
 4/6,12,36,56,60



$$\begin{aligned} \rightarrow \sum M_C = 0: 6A_y - 2(3) &= 0 \\ A_y &= 1 \text{ kN} \\ C_x = 2 \text{ kN}, C_y &= 1 \text{ kN} \end{aligned}$$

Joint A:

$$\begin{cases} \sum F_y = 0: 1 - AE \sin 45^\circ = 0 \\ AE = 1.414 \text{ kN C} \\ \sum F_x = 0: AB - 1.414 \cos 45^\circ = 0 \\ AB = 1 \text{ kN T} \end{cases}$$

Joint E:

$$\begin{cases} \sum F_x = 0: 1.414 \sin 45^\circ - DE = 0 \\ DE = 1 \text{ kN C} \\ \sum F_y = 0: 1.414 \cos 45^\circ - BE = 0 \\ BE = 1 \text{ kN T} \end{cases}$$

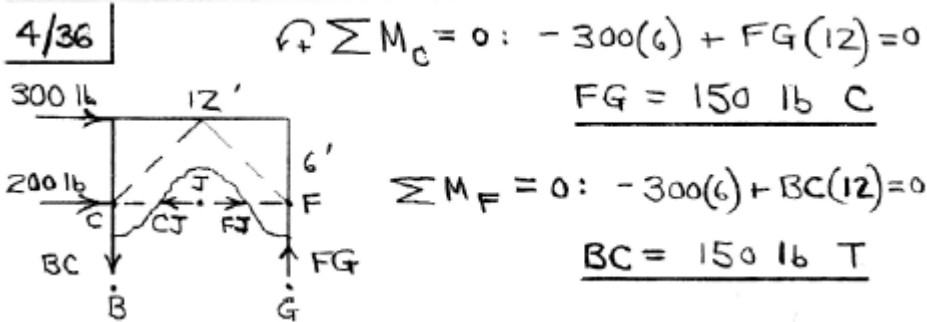
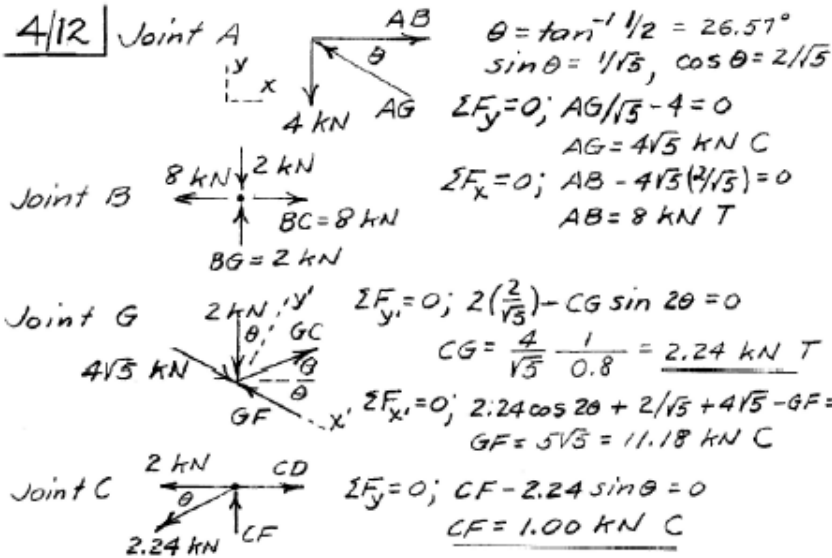
Joint B:

$$\begin{cases} \sum F_y = 0: 1 - BD \sin 45^\circ = 0 \\ BD = 1.414 \text{ kN C} \\ \sum F_x = 0: BC - 1.414 \cos 45^\circ - 1 = 0 \\ BC = 2 \text{ kN T} \end{cases}$$

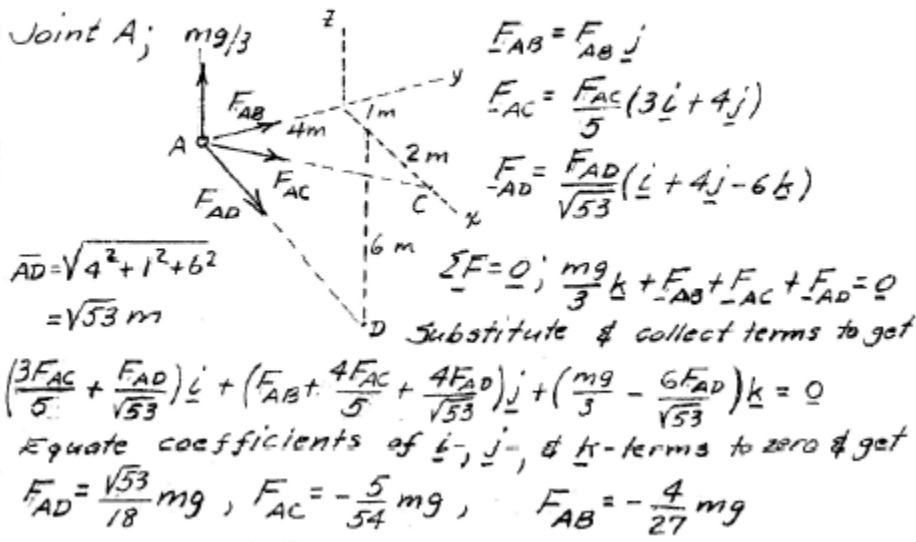
Joint C:

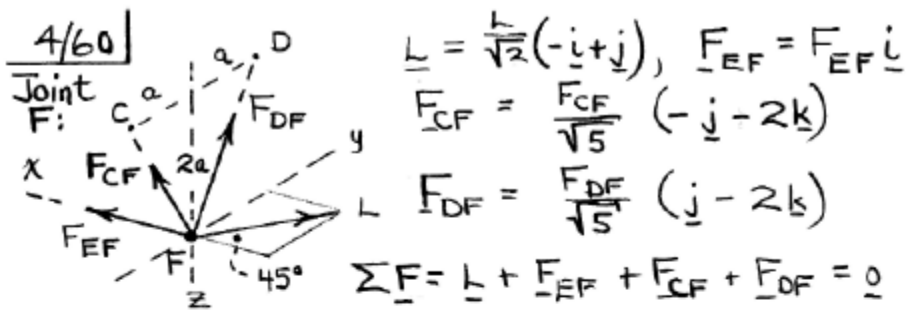
$$\sum F_y = 0: CD - 1 = 0 \\ CD = 1 \text{ kN T}$$

(Joint D checks)

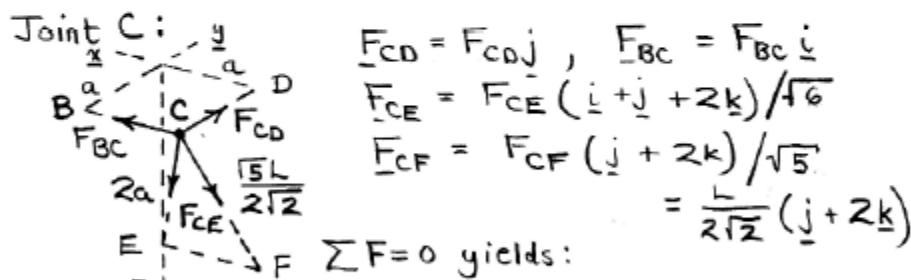


4/56 From truss as a whole  $\sum M = 0$  gives tension in vertical wire at C  $T_C = \frac{1}{3}mg$   
 By symmetry &  $\sum F_z = 0; T_A = T_B = \frac{1}{3}mg$





$$\begin{aligned} \underline{i}: & -\frac{L}{\sqrt{2}} + F_{EF} = 0 & F_{EF} &= \frac{L}{\sqrt{2}} \\ \underline{j}: & \frac{L}{\sqrt{2}} - \frac{F_{CF}}{\sqrt{5}} + \frac{F_{DF}}{\sqrt{5}} = 0 \\ \underline{k}: & -\frac{2}{\sqrt{5}}F_{CF} - \frac{2}{\sqrt{5}}F_{DF} = 0 \end{aligned} \left. \vphantom{\begin{aligned} \underline{i}: \\ \underline{j}: \\ \underline{k}: \end{aligned}} \right\} \begin{aligned} F_{CF} &= \frac{\sqrt{5}L}{2\sqrt{2}} \\ F_{DF} &= -\frac{\sqrt{5}L}{2\sqrt{2}} \end{aligned}$$



$$\begin{aligned} \underline{i}: & 0 + F_{BC} + \frac{F_{CE}}{\sqrt{6}} = 0 \\ \underline{j}: & F_{CD} + \frac{F_{CE}}{\sqrt{6}} + \frac{L}{2\sqrt{2}} = 0 \\ \underline{k}: & \frac{2F_{CE}}{\sqrt{6}} + \frac{L}{\sqrt{2}} = 0 \end{aligned} \left. \vphantom{\begin{aligned} \underline{i}: \\ \underline{j}: \\ \underline{k}: \end{aligned}} \right\} \begin{aligned} F_{BC} &= \frac{L\sqrt{2}}{4} \\ F_{CD} &= 0 \\ F_{CE} &= -\frac{L\sqrt{3}}{2} \end{aligned}$$