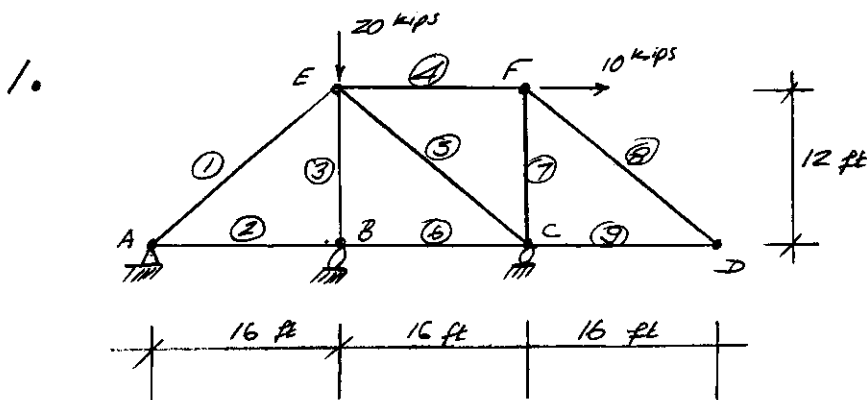
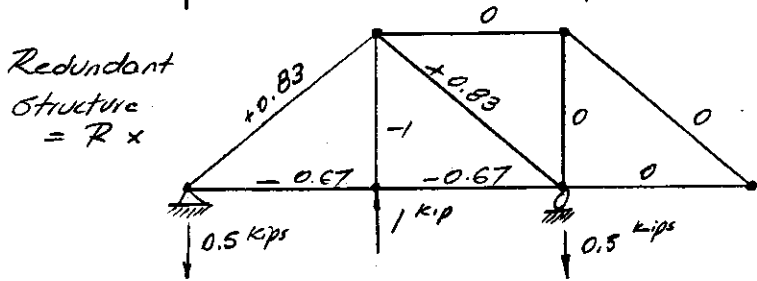
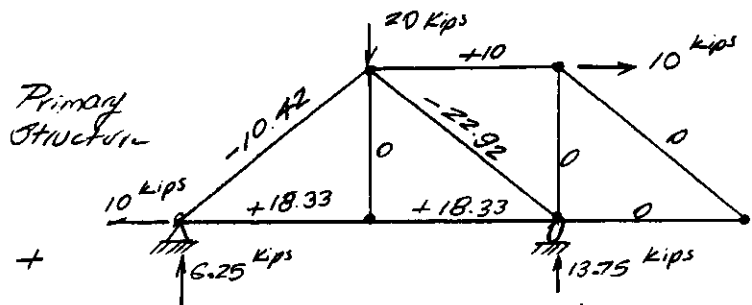


FE I

508362



$A_1 = 5 \text{ in}^2$
 $\alpha = 6.5 \times 10^{-6} \frac{1}{\text{of}}$
 $E = 30,000 \text{ ksi}$



Member	A_i	L_i	F_i^I Loads	f_i	$\frac{F_i^I L_i}{A_i E}$	$f_i \frac{L_i}{A_i E}$	$\alpha L_i \Delta T_i$	$(\alpha L_i \Delta T_i) f_i$	
1	5	240	-10.42	+0.83	-416.7/E	33.33/E	0.0624	0.052	
2	5	192	+18.33	-0.67	-469.3/E	17.07/E	0	0	
3	5	144	0	-1	0	28.8/E	0	0	
4	5	192	10.0	0	0	0	0.04992	0	
5	5	240	-22.92	0.83	-916.7/E	33.33/E	0	0	
6	5	192	+18.33	-0.67	-469.3/E	17.07/E	0	0	
7	5	144	0	0	0	0	0	0	
8	5	240	0	0	0	0	0	0	
9	5	192	0	0	0	0	0	0	
F_i^I					-2272	129.6			0.052
F_i^I Temp					= 0	= 0			

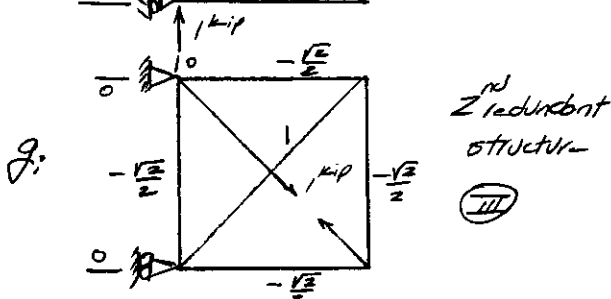
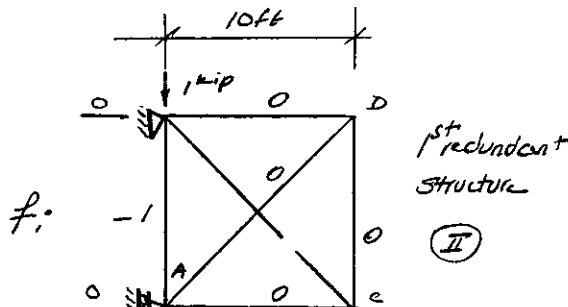
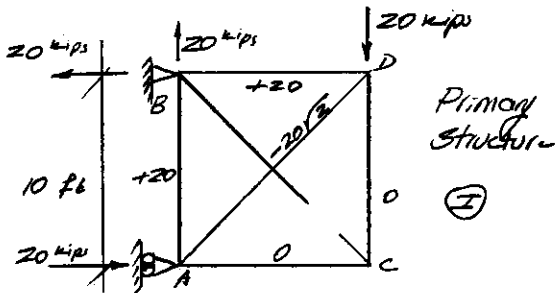
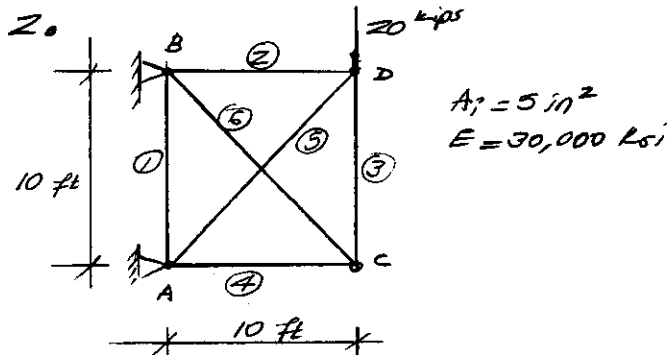
$\textcircled{a} : \sqrt{8}^I + \sqrt{8}^I = 0 \Rightarrow \frac{-2272}{E} + R \left(\frac{129.6}{E} \right) = 0 \Rightarrow R = 17.53 \text{ kips}$

$F_i = F_i^I + R f_i = F_i^I + 17.53 f_i$

$\textcircled{b} : \sqrt{8}^I + \sqrt{8}^I = 0 \Rightarrow 0.052 + R \left(\frac{129.6}{E} \right) = 0 \Rightarrow R = -12.04 \text{ kips}$

$F_i = F_i^I + R f_i = 0 - 12.04 f_i$

Member	$F_i^{(a)}$	$F_i^{(b)}$
1	4.13	-10
2	6.58	+8.07
3	-17.53	12.04
4	10.0	0
5	-8.37	-10
6	6.58	+8.07
7	0	0
8	0	0
9	0	0



$$\begin{aligned} \gamma_A^I + \gamma_A^I + \gamma_A^{II} &= 0 \\ \delta_{B-C}^I + \delta_{B-C}^{II} + \delta_{B-C}^{III} &= 0 \end{aligned}$$

$$\gamma_A^I = \sum \frac{F_i^I \cdot f_i^I}{k_i}$$

$$\gamma_A^{II} = R_1 \sum \frac{f_i^{II}}{k_i}$$

$$\gamma_A^{III} = R_2 \sum \frac{f_i^{III}}{k_i}$$

$$\delta_{B-C}^I = \sum \frac{F_i^I \cdot \rho_i^I}{k_i}$$

$$\delta_{B-C}^{II} = R_1 \sum \frac{f_i^{II} \cdot \rho_i^{II}}{k_i}$$

$$\delta_{B-C}^{III} = R_2 \sum \frac{f_i^{III} \cdot \rho_i^{III}}{k_i}$$

FE 1

Member	A _i	L _i	F ₁ ^I	f ₁	g ₁	$\frac{F_1^I L_i}{A_i E}$	f ₁	$\frac{P_1^I L_i}{A_i E}$	$\frac{P_2^I L_i}{A_i E}$	$\frac{F_1^I L_i}{A_i E} g_i$	$\frac{g_i^2 L_i}{A_i E}$
1	5	120	20	-1	$-\frac{\sqrt{2}}{2}$	$-\frac{480}{E}$		$\frac{24}{E}$	$\frac{16.97}{E}$	$-\frac{339.4}{E}$	$\frac{12}{E}$
2	5	120	20	0	$-\frac{\sqrt{2}}{2}$	0		0	0	$-\frac{339.4}{E}$	$\frac{12}{E}$
3	5	120	0	0	$-\frac{\sqrt{2}}{2}$	0		0	0	0	$\frac{12}{E}$
4	5	120	0	0	$-\frac{\sqrt{2}}{2}$	0		0	0	0	$\frac{12}{E}$
5	5	120	-20	0	1	0		0	0	$-\frac{960}{E}$	$\frac{33.94}{E}$
6	5	120	0	0	1	0		0	0	0	$\frac{33.94}{E}$
						$-\frac{480}{E}$		$\frac{24}{E}$	$\frac{16.97}{E}$	$-\frac{1638.82}{E}$	$\frac{115.88}{E}$

→

$$-\frac{480}{E} + R_1 \frac{24}{E} + R_2 \frac{16.97}{E} = 0$$

$$-\frac{1638.82}{E} + R_1 \frac{16.97}{E} + R_2 \frac{115.88}{E} = 0$$

or

$$24 R_1 + 16.97 R_2 = 480$$

$$16.97 R_1 + 115.88 R_2 = 1638.82$$

∴

$$R_1 = 11.16 \text{ kips}$$

$$R_2 = 12.51 \text{ kips}$$

$$F_i = F_1^I + F_i^II + F_i^III$$

$$= F_1^I + R_1 f_i + R_2 g_i$$

- ① $-5.91 \times 10^{-3} \approx 0 \text{ kips}$
- ② 11.15 kips
- ③ -8.85 kips
- ④ -8.85 kips
- ⑤ -15.77 kips
- ⑥ 12.51 kips