



$\theta = 60^\circ$ ,  $L = 5.5 \text{ in}$ ,  $\frac{1}{2}W$  acting at ⑩ and ⑭, Reaction force  $\frac{1}{2}W$  acting at ① and ⑧.  
 $\sum F_y = 0 = -\frac{1}{2}W - \frac{1}{2}W + 2R$ ,  $R = \frac{1}{2}W$ ,  $\sin\theta = \sin 60^\circ \approx 0.866$ ,  $\cos\theta = \cos 60^\circ = 0.5$

①  $\sum F_y = 0 = F_8 \sin\theta + \frac{1}{2}W$ ,  $F_8 = -\frac{W}{2\sin\theta}$   
 $\sum F_x = 0 = F_1 + F_8 \cos\theta$ ,  $F_1 = -F_8 \cos\theta = -\left(-\frac{W}{2\sin\theta}\right) \cdot \cos\theta = \frac{W \cos\theta}{2\sin\theta}$

⑨  $\sum F_y = 0 = -F_8 \sin\theta - F_9 \sin\theta$ ,  $F_9 = -F_8 = \frac{W}{2\sin\theta}$   
 $\sum F_x = 0 = F_{22} + F_9 \cos\theta - F_8 \cos\theta$ ,  $F_{22} = F_8 \cos\theta - F_9 \cos\theta = -\frac{W \cos\theta}{2\sin\theta} - \frac{W \cos\theta}{2\sin\theta} = -\frac{W \cos\theta}{\sin\theta}$

②  $\sum F_y = 0 = F_9 \sin\theta + F_{10} \sin\theta$ ,  $F_{10} = -F_9 = -\frac{W}{2\sin\theta}$   
 $\sum F_x = 0 = F_2 - F_1 + F_{10} \cos\theta - F_9 \cos\theta$ ,  $F_2 = F_1 - F_{10} \cos\theta + F_9 \cos\theta = \frac{W \cos\theta}{2\sin\theta} + \frac{W \cos\theta}{2\sin\theta} + \frac{W \cos\theta}{2\sin\theta} = \frac{3W \cos\theta}{2\sin\theta}$

⑩  $\sum F_y = 0 = -F_{10} \sin\theta - F_{11} \sin\theta - \frac{1}{2}W$ ,  $F_{11} = \frac{1}{\sin\theta} \left(\frac{1}{2}W + \frac{W}{2\sin\theta} \cdot \sin\theta\right) = 0$   
 $\sum F_x = 0 = F_{23} + F_{11} \cos\theta - F_{12} - F_{10} \cos\theta$ ,  $F_{23} = F_{12} + F_{10} \cos\theta = -\frac{W \cos\theta}{\sin\theta} - \frac{W \cos\theta}{2\sin\theta} = -\frac{3W \cos\theta}{2\sin\theta}$

③  $\sum F_y = 0 = F_{12} \sin\theta + F_{11} \sin\theta$ ,  $F_{12} = -F_{11} = 0$   
 $\sum F_x = 0 = F_3 - F_2 + F_{12} \cos\theta - F_{11} \cos\theta$ ,  $F_3 = F_2 = \frac{3W \cos\theta}{2\sin\theta}$

⑪  $\sum F_y = 0 = -F_{12} \sin\theta - F_{13} \sin\theta = 0$ ,  $F_{13} = 0$   
 $\sum F_x = 0 = F_{24} + F_{13} \cos\theta - F_{23} - F_{12} \cos\theta$ ,  $F_{24} = F_{23} = -\frac{3W \cos\theta}{2\sin\theta}$

④ is same as ③, ⑫ is same as ⑪, repeated and symmetrical.

$F_1 = F_7 = \frac{W \cos\theta}{2\sin\theta} = 0.2867W$  ⑦

$F_2 = F_3 = F_4 = F_5 = F_6 = 0.866W$  ⑦

$F_8 = F_{21} = -\frac{W}{2\sin\theta} = -0.577W$  ②

$F_9 = F_{20} = \frac{W}{2\sin\theta} = 0.577W$  ⑦

$F_{10} = F_{19} = -\frac{W}{2\sin\theta} = -0.577W$  ②

$F_{22} = F_{27} = -\frac{W \cos\theta}{\sin\theta} = -0.577W$  ②

$F_{23} = F_{24} = F_{25} = F_{26} = -\frac{3W \cos\theta}{2\sin\theta} = -0.866W$  ②

④  $\sum F_y = F_{13} \sin\theta + F_{14} \cos\theta$ ,  $F_{14} = -F_{13} = 0$   
 $\sum F_x = -F_3 + F_4 - F_{13} \cos\theta + F_{14} \cos\theta$ ,  $F_4 = F_3 = \frac{3W \cos\theta}{2\sin\theta}$

⑫  $\sum F_y = 0 = -F_{14} \sin\theta - F_{15} \sin\theta$ ,  $F_{15} = -F_{14} = 0$   
 $\sum F_x = 0 = -F_{24} + F_{25} - F_{14} \cos\theta + F_{15} \cos\theta$ ,  $F_{25} = F_{24} = -\frac{3W \cos\theta}{2\sin\theta}$