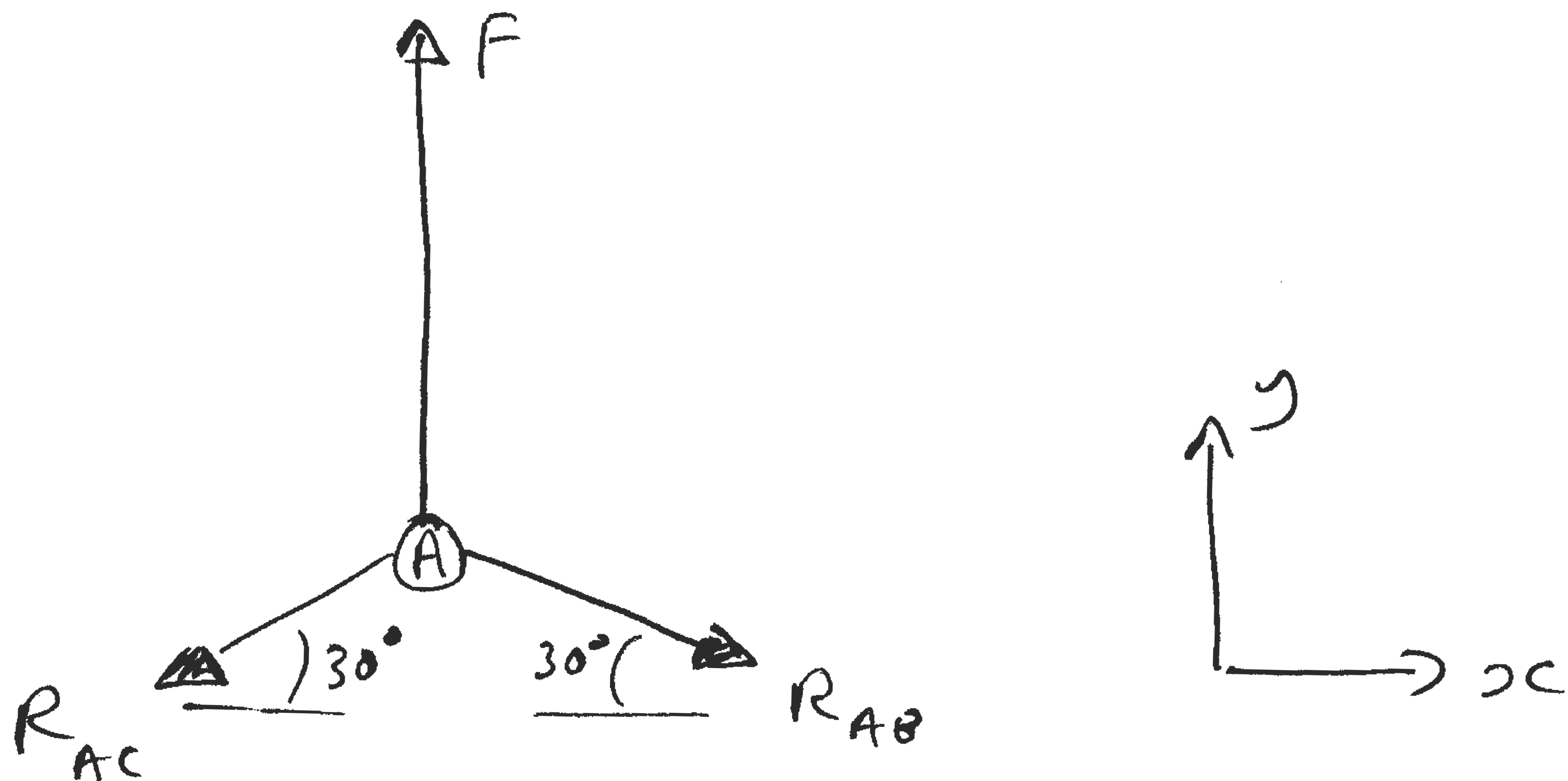


Problem M1 Solutions



i) By symmetry $R_{AC} = R_{AB} = R$

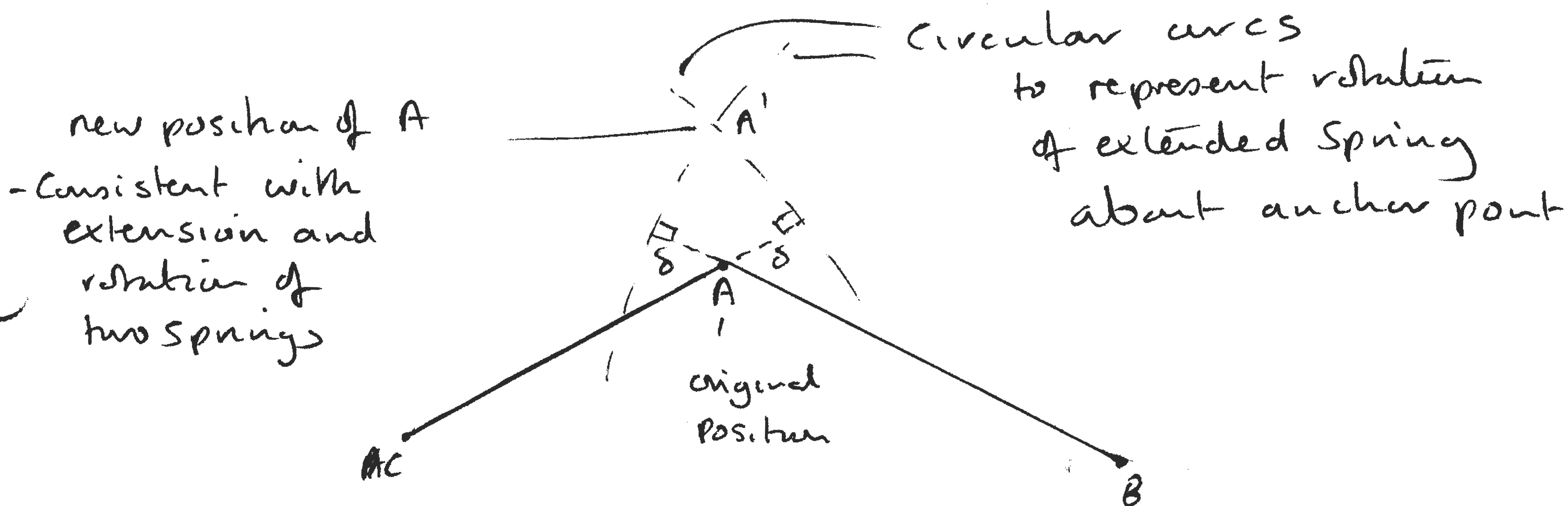
Apply equilibrium in y dir

$$F - R_{AC} \sin 30 - R_{AB} \sin 30 = 0$$

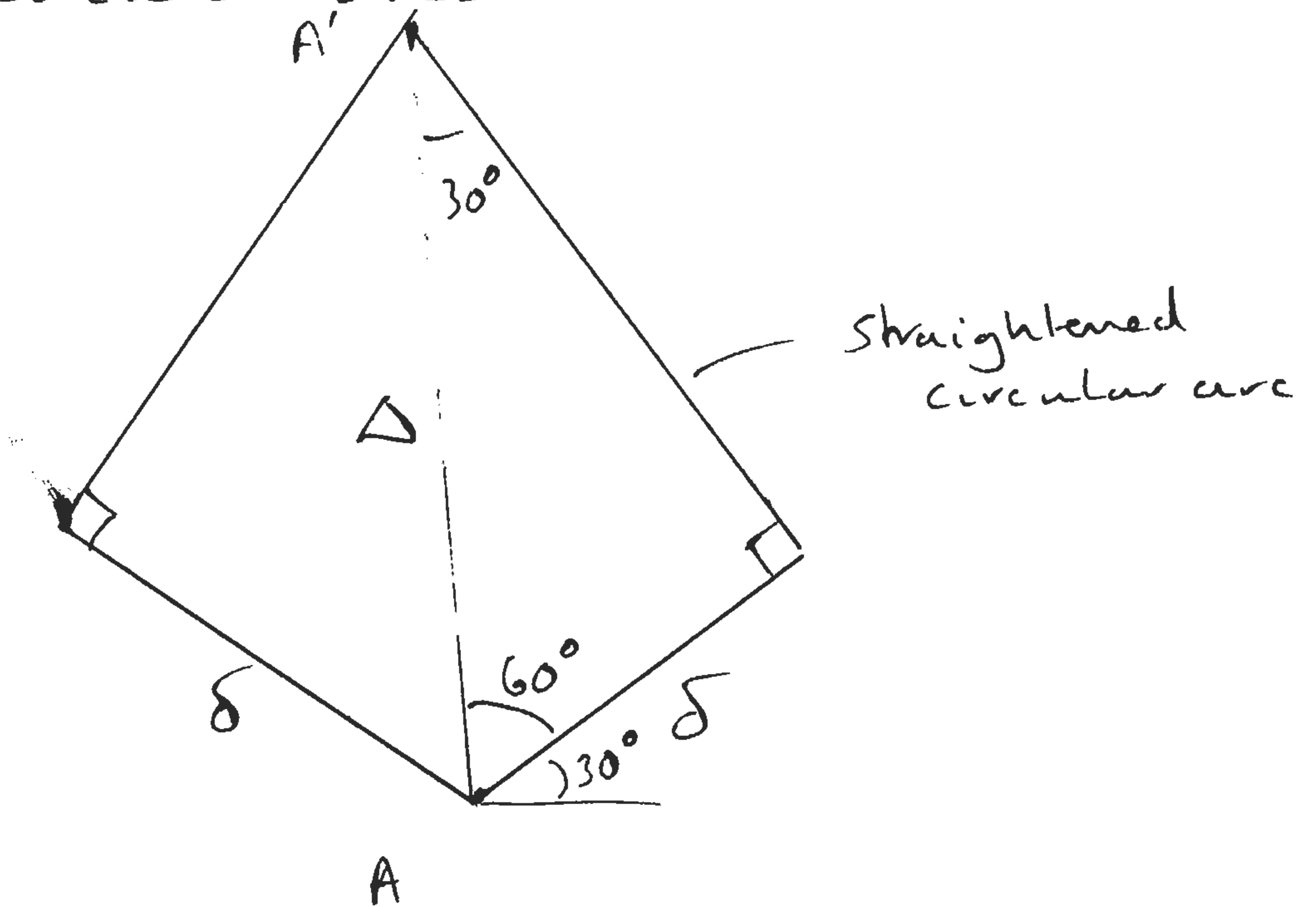
$$F = 2 \times R \times 0.5 = R \iff R_{AC} = R_{AB} = F$$

ii) $\therefore \Delta_{AC} = \Delta_{AB} = \frac{R}{k} \iff$

iii) Each spring extends by $\Delta = R/k$
 Each spring can rotate about its fixed end
 Springs remain attached at point A.



Enlarge key region, assume small deflections allow us to ignore circular arcs



Vertical displacement of A to $A' = \Delta$

$$\Delta \sin 30^\circ = \delta$$

$$\Delta = 2\delta = \frac{2F}{k} \lll$$