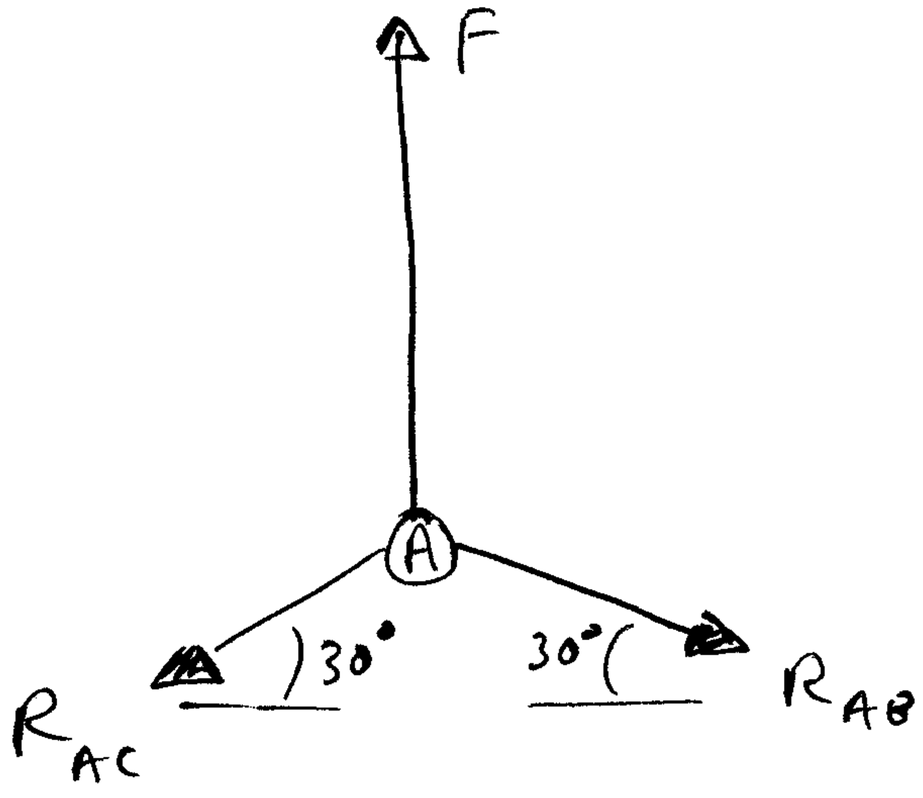
Problem M1 Solutions



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

Apply equilibrium in y dⁿ

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

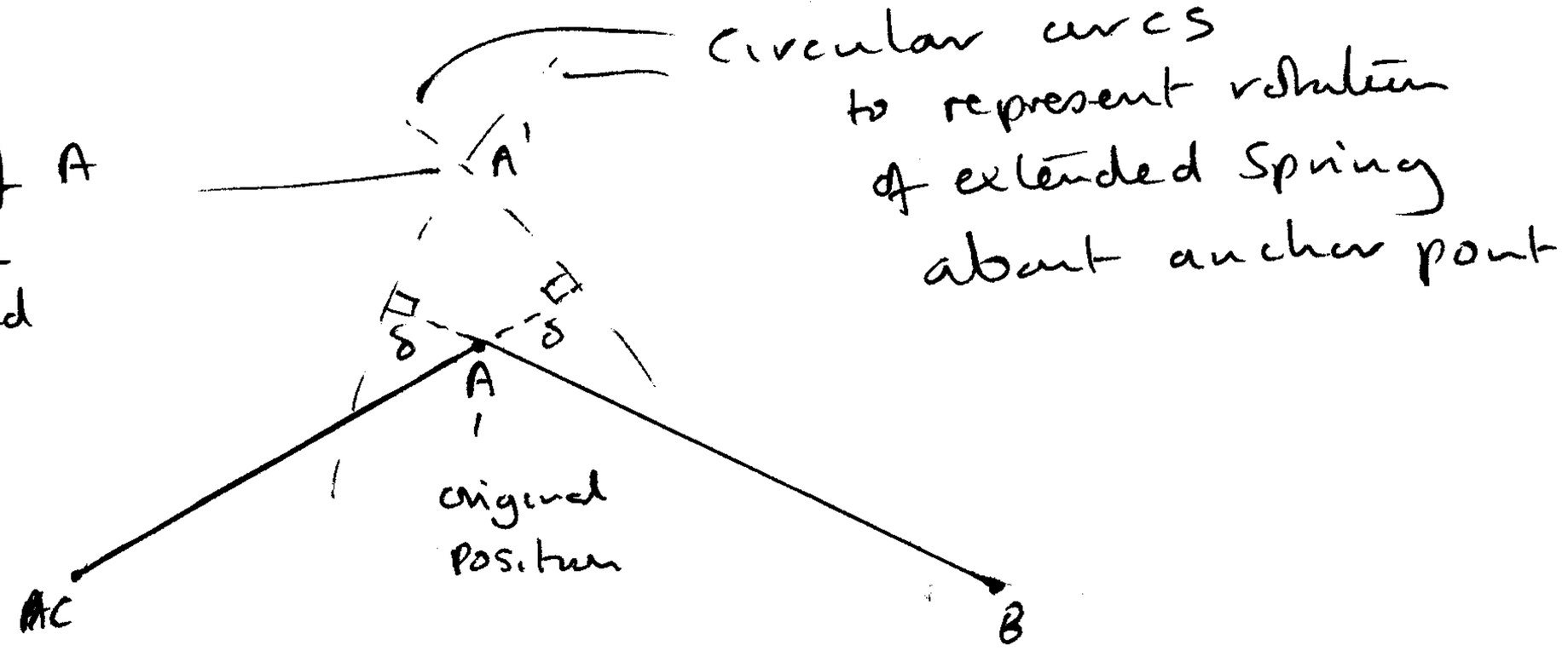
$$F = 2 \times R \times 0.5 = R \quad \Leftarrow \qquad R_{AC} = R_{AB} = F \Leftarrow$$

ii) $\therefore \delta_{AC} = \delta_{AB} = \dfrac{R}{K} \quad \Leftarrow$

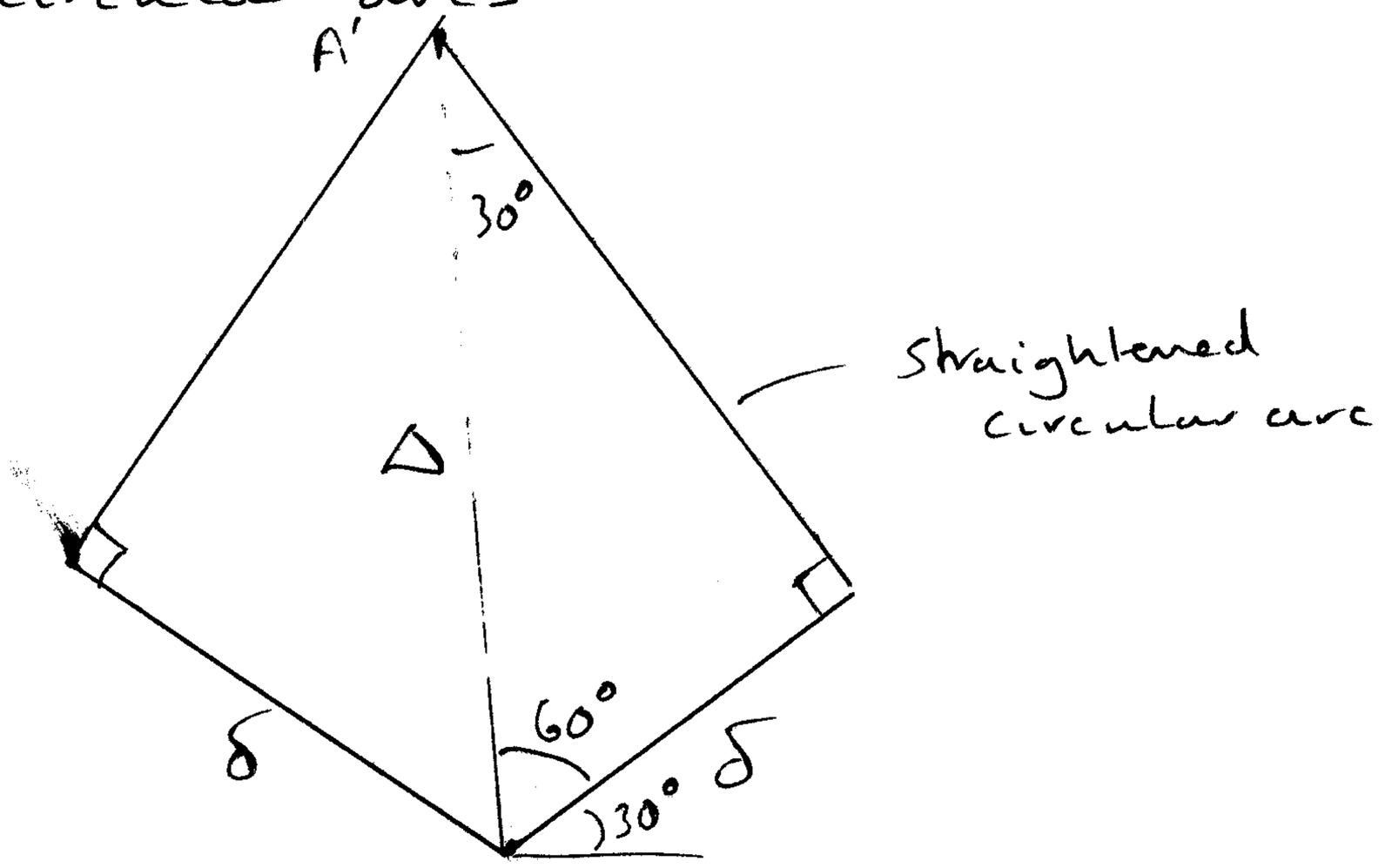
iii) Each spring extends by $\delta = R/K$

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



A

Vertical displacement of A to A' = Δ

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

$$\Delta = 2\delta = \frac{2F}{K}$$