$$F_4 \quad F_3 \qquad F_T = F_3 + \sqrt{F_4^2 + F_2^2} \qquad\qquad F_4 = F_2$$
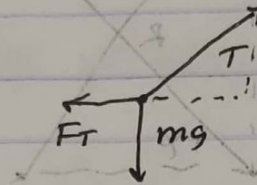
$$q \quad F_2 \qquad = F_3 + \sqrt{2} \cdot F$$

$$= \frac{kq^2}{4L^2\sin^2\theta} + \sqrt{2} \cdot \frac{kq^2}{\left(\frac{2}{\sqrt{2}}L\sin^2\theta\right)^2}$$

$$F_T = \frac{kq^2}{L^2\sin^2\theta}\left(\frac{1}{4} + \frac{\sqrt{2}}{2}\right)$$

$$T_x = T\sin\theta$$

$$T_y = T\cos\theta$$

$$F_T \quad mg \qquad T$$

$$T\sin\theta = \frac{kq^2}{L^2\sin^2\theta}\left(\frac{1}{4} + \frac{\sqrt{2}}{2}\right) \qquad T = \frac{F_y}{\cos\theta}$$

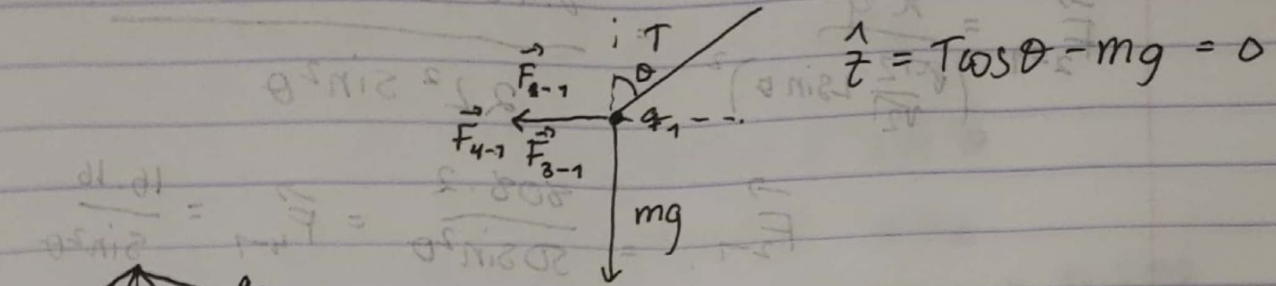$$\frac{\sin^3\theta}{\cos\theta} = \frac{kq^2 \, mg}{WL^2} \qquad si \quad k = \frac{kq^2 \, mg}{WL^2} \qquad F_y = w$$

$$\frac{\sin^3\theta}{\cos\theta} = k \quad\rightarrow\quad k^2 = \frac{\sin^6\theta}{\cos^2\theta}$$

$$\hat{z} = T\cos\theta - mg = 0$$
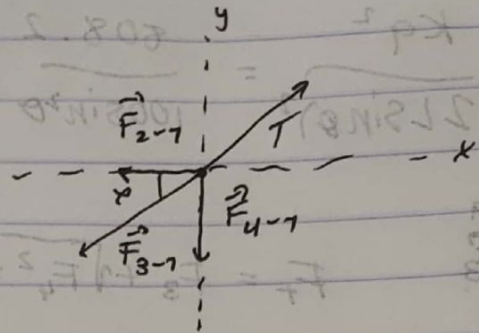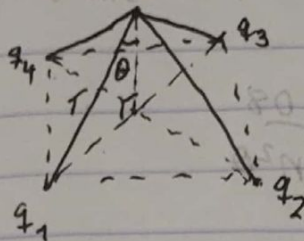
$$\sum F_x = -\vec{F}_{2-1} - \vec{F}_{3-1}\cos\varphi + T\sin\theta\cos\varphi = 0$$

$$\sum F_y = T\sin\theta\sin\varphi - \vec{F}_{4-1} - \vec{F}_{3-1}\sin\varphi = 0$$
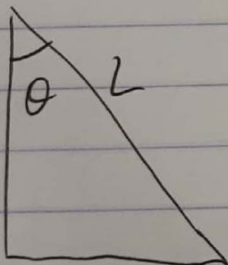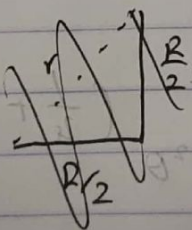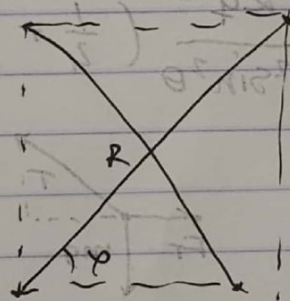
$$\sin\theta = \frac{R/2}{L}$$

$$2L\sin\theta = R$$
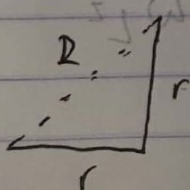
$$R = \sqrt{r^2 + r^2}$$

$$R = \sqrt{2}\, r$$

$$r = \frac{2}{\sqrt{2}} L\sin\theta$$

$$r^2 = \left(\frac{R}{2}\right)^2 + \left(\frac{R}{2}\right)^2$$

$$r = \sqrt{2L^2\sin^2\theta}$$

$$r = \sqrt{2}\, L\sin\theta$$

Preparcial

$$k^2 = \frac{\sin^6\theta}{1-\sin^2\theta}$$

$$k^2(1-\sin^2\theta) = \sin^6\alpha$$

$$k^2 = \sin^6\theta + k^2\sin^2\theta$$

$$k = \frac{kq^2 w}{(5)^2} = \frac{8.98\times10^9 \cdot (3\times10^{-4})^2 \cdot 114.6}{114.6 \cdot 25} = 0.282$$

$$k^2 = 0.07as24$$