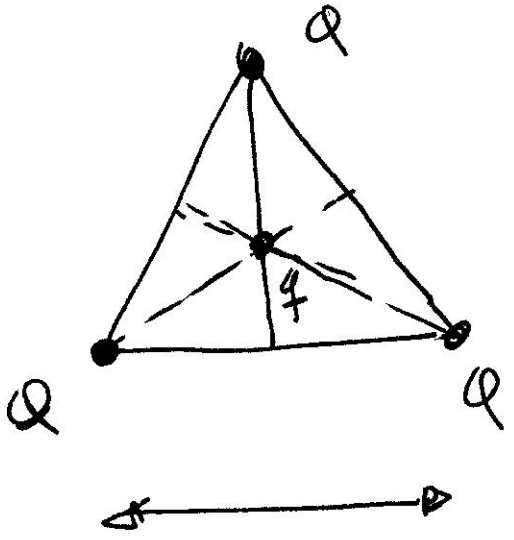
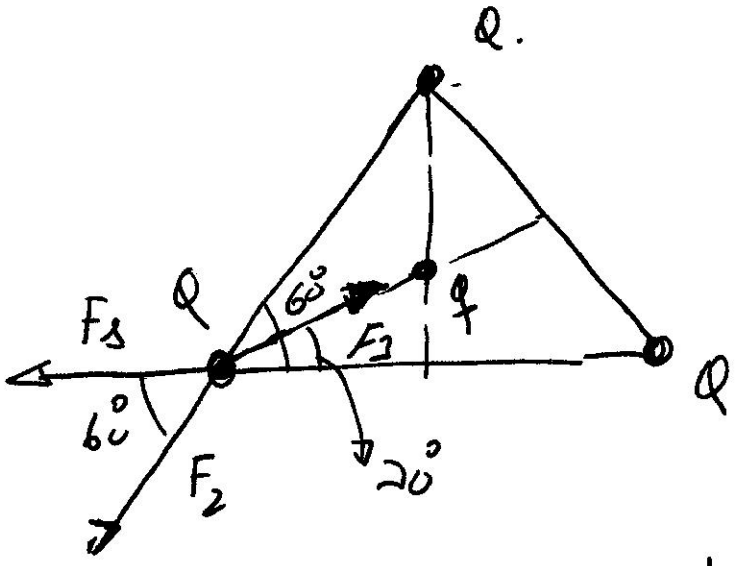
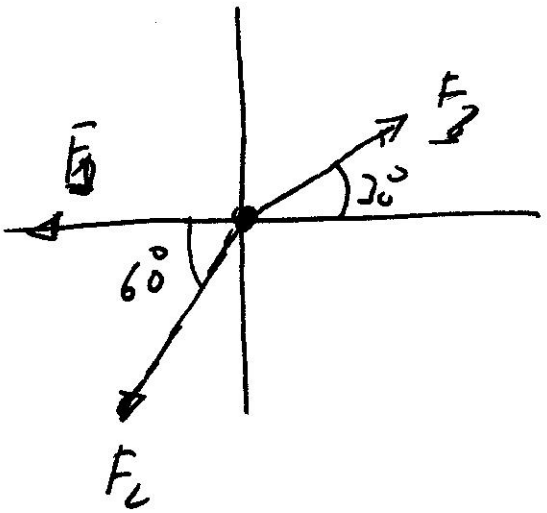


$q = 2 \cdot 10^{-3} C$

q = positive

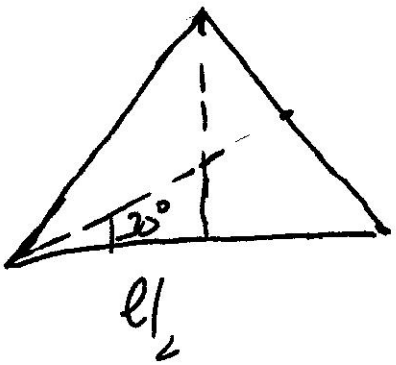
$3\sqrt{3}\ m$





$$|\vec{F_3}| \cos 20^\circ = F_1 + F_2 \cos 60^\circ \quad (1)$$

Distancia de Q a q ?



$$\cos 30^\circ = \frac{l/2}{r} \Rightarrow r = \frac{l}{2}\,\frac{2}{\sqrt{3}} = \frac{l}{\sqrt{3}}$$

$$|\vec{F_3}| = K\,\frac{Q\,q}{\left(\frac{l}{\sqrt{3}}\right)^2} = K\,\frac{Q.q}{\frac{l^2}{3}} \Rightarrow \frac{K\,Q.q.3}{l^2}$$

$$|\vec{F_1}| = |F_2| = K\,\frac{Q.Q}{l^2} \Rightarrow K\,\frac{Q^2}{l^2}$$

tomando a expresión (1)

$$|\vec{F_3}|\cdot\cos 30^\circ = |F_1| + |F_2|\cos 60^\circ$$

$$3K\,\frac{Q.q}{l^2}\cdot\frac{\sqrt{3}}{2} = |\vec{F_1}|\,(1+\cos 60^\circ)$$

$$\downarrow$$

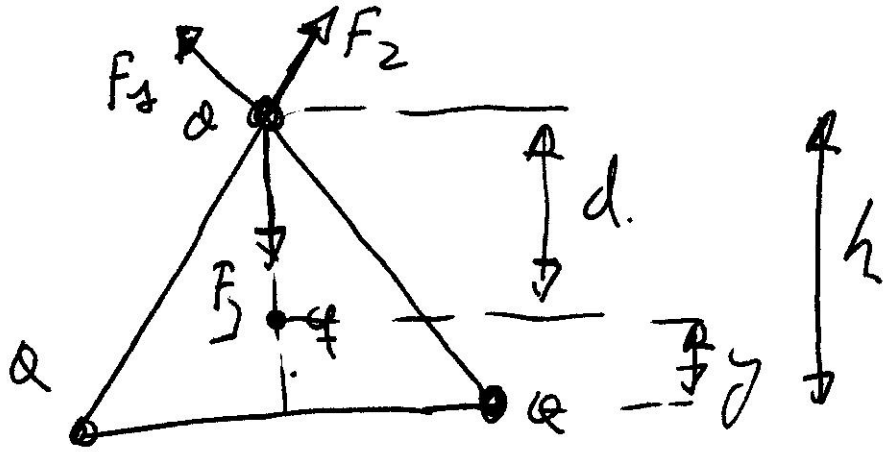
$$|\vec{F_1}| = |\vec{F_2}|$$

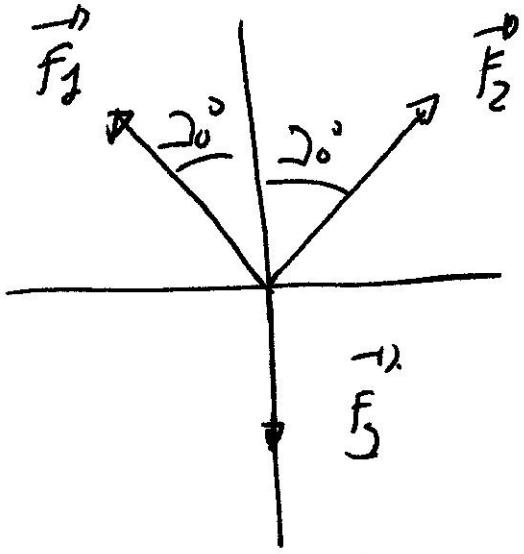
$$3K\,\frac{Q\,q}{l^2}\cdot\frac{\sqrt{3}}{2} = K\,\frac{Q^2}{l^2}\left(1+\frac{1}{2}\right)$$

$$2k\frac{q\cdot q}{\ell^2}\cdot\frac{\sqrt{3}}{2}=k\frac{Qq}{\ell^2}\cdot\frac{3}{2}$$

$$Q=q\sqrt{3}\ //\ Q=q\sqrt{3}$$

Outra possibilidade



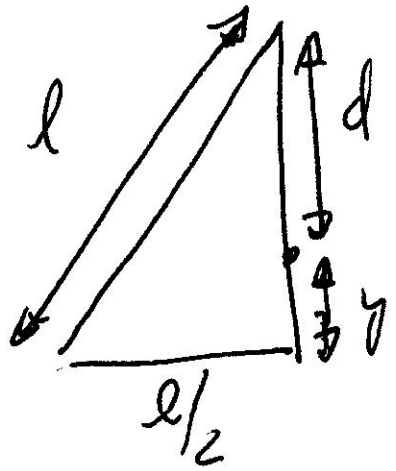


resultante de $\vec{F_1}$ e $\vec{F_2}$

$$2 \cdot K \frac{Q \cdot Q}{\ell^2} \cos 30^\circ = \cancel{2} K \frac{Q Q}{\ell^2} \frac{\sqrt{3}}{\cancel{2}} \quad (1)$$

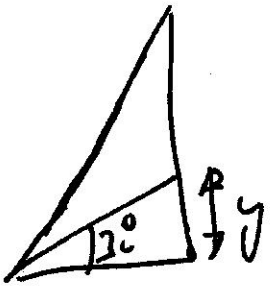
calculamos $\vec{F_3}$

$$|\vec{F_3}| = K \cdot \frac{Q \cdot q}{d^2}$$



$$l^2 = \frac{l^2}{4} + h^2 \Rightarrow h^2 = l^2\left(1 - \frac{1}{4}\right)$$

$$h^2 = \frac{3}{4} l^2 \Rightarrow h = \frac{\sqrt{3}}{2} l$$



$$\tan 30^\circ = \frac{y}{l/2} \Rightarrow \frac{1}{\sqrt{3}} = \frac{y}{l/2}$$

$$y = \frac{l/2}{\sqrt{3}} \Rightarrow y = \frac{l}{2\sqrt{3}}$$

$$d = h - y = \frac{\sqrt{3}}{2} l - \frac{l}{2\sqrt{3}} = \left(\frac{\sqrt{3}}{2} - \frac{1}{2\sqrt{3}}\right) l$$

$$d = \left(\frac{\sqrt{3}\cdot\sqrt{3} - 1}{2\sqrt{3}}\right) l \Rightarrow d = \frac{3-1}{2\sqrt{3}} l$$

$$d = \frac{l}{\sqrt{3}}$$

$$|\vec{F_3}| = k\frac{Q\,q_0}{\frac{\ell^2}{3}} \Rightarrow |\vec{F_3}| = 3k\frac{Q\cdot q_0}{\ell^2}$$

$$k\frac{Q\cancel{Q}}{\cancel{\ell^2}}\sqrt{3} = 3k\frac{\cancel{Q}\cdot q_0}{\cancel{\ell^2}}$$

$$Q = \frac{3\,q_0}{\sqrt{3}}\,;\quad Q = \frac{3\sqrt{3}}{\sqrt{3}\sqrt{3}}\cdot q$$

$$Q = \sqrt{3}\cdot q_0$$