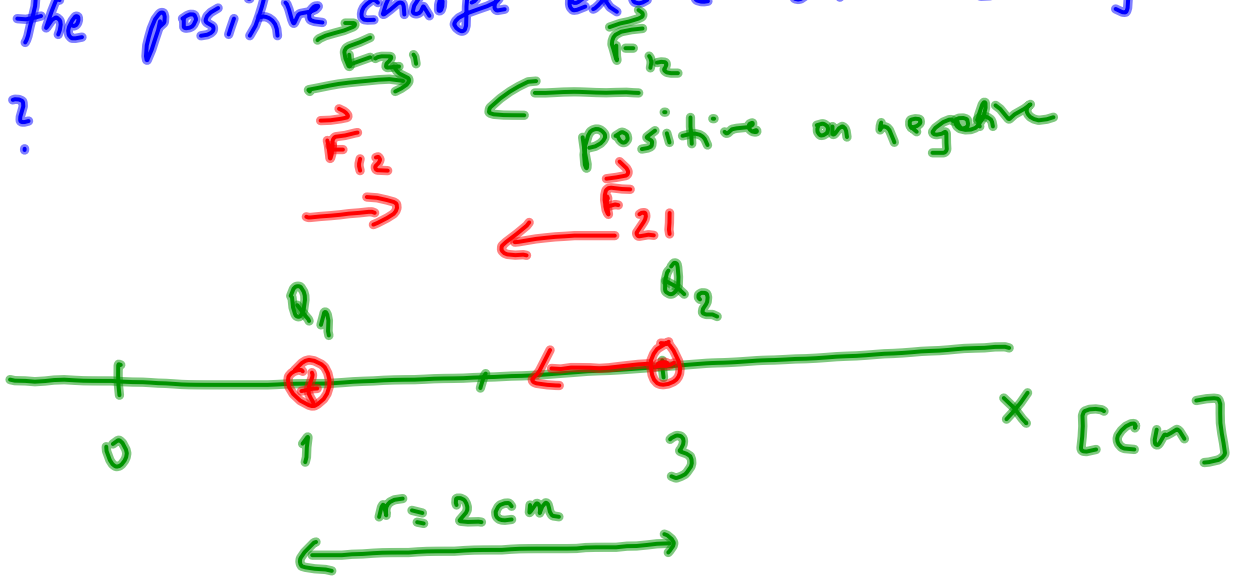
A $1\,\mu C$ charge is at 1 cm and a $-1.5\,\mu C$ charge is at $x = 3$ cm. What force does the positive charge exert on the negative one?



$$|\vec{F}_{21}| = k \cdot \frac{|Q_1| \cdot |Q_2|}{r^2} = \frac{9 \cdot 10^9 \frac{Nm^2}{C^2} \cdot 10^{-6} C \cdot 1.5 \cdot 10^{-6} C}{(2 \cdot 10^{-2})^2 m^2}$$

$$= \frac{9 \cdot 1.5}{4} \cdot \frac{10^{9-6-6}}{10^{-4}}$$

$$= \frac{9 \cdot 1.5}{4} \cdot \frac{10^{-3}}{10^{-4}} =$$

$$= 34 N$$

$$Q_1 = 1 \mu C = 10^{-6} C$$

$$Q_2 = -1.5 \mu C = -1.5 \cdot 10^{-6} C$$

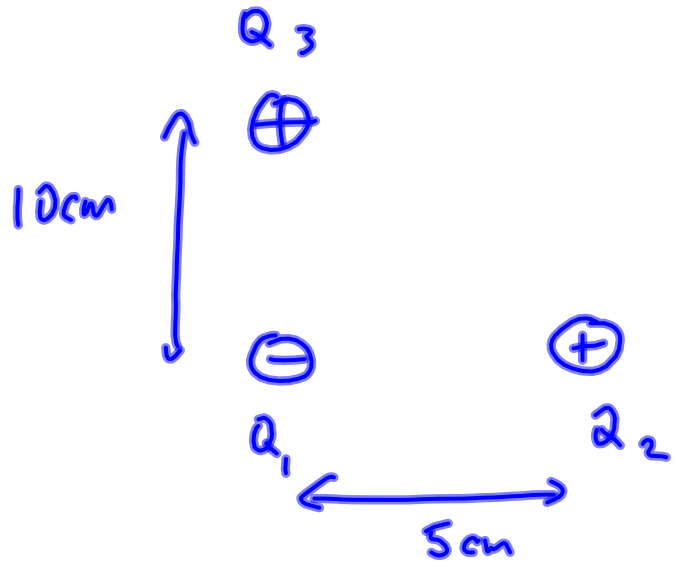
$$k = 9 \cdot 10^9 \, Nm^2/C^2$$

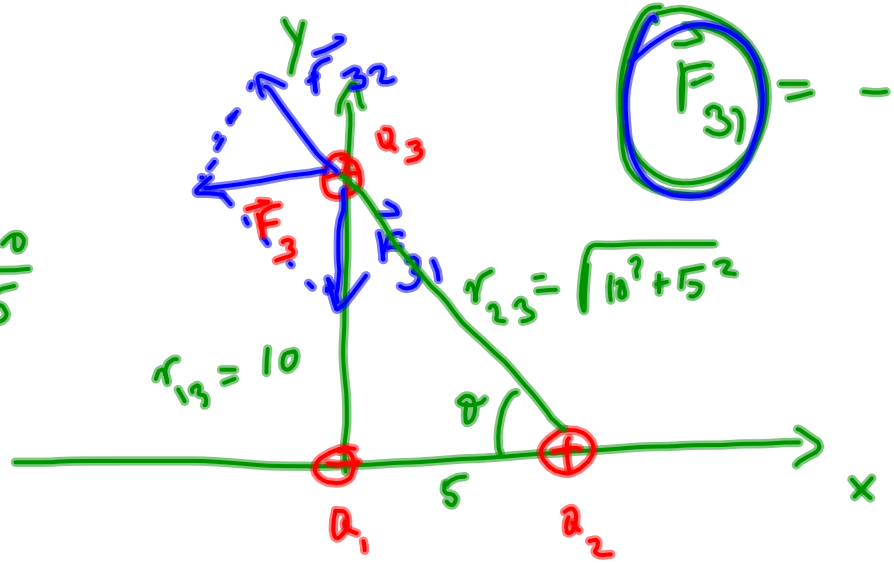
$$r = 2 cm$$

$$\vec{F}_{21} = -34 N$$

3 charged particles with $Q_1 = -50\,nC$, $Q_2 = 50\,nC$ and $Q_3 = 30\,nC$ are placed on the corners of the 5 cm x 10 cm rectangle.

What is the net force on charge Q_3 due to other 2 charges.[2]

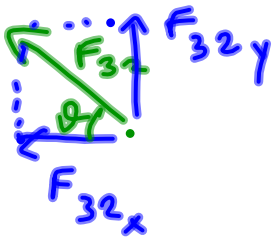




$$\vec{F}_{31} = -1.35 \cdot 10^{-3}\,\hat{j}\ N$$

$$\| \quad k \cdot \frac{|q_1||q_3|}{r_{13}^2}$$

$$\tan\theta = \frac{10}{5}$$



$\vec{F}_3 = ?$ $\qquad \vec{F}_3 = \vec{F}_{31} + \vec{F}_{32}$

$$\vec{F}_{32} = -F_{32}\cos\theta\,\hat{i} + F_{32}\sin\theta\,\hat{j}$$

$$|\vec{F}_3| = \sqrt{F_{3x}^2 + F_{3y}^2}$$

$$\phi = \tan^{-1}\left|\frac{F_{3y}}{F_{3x}}\right|$$