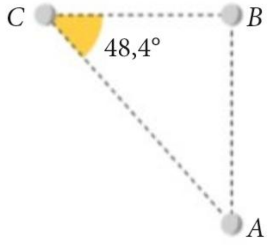
27/9/2022

50 ◆◆◆ **ORA PROVA TU**

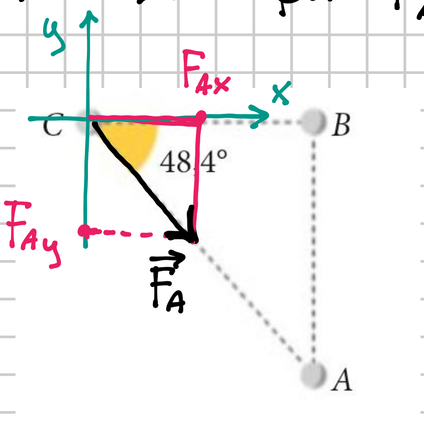


Tre cariche puntiformi $Q_A = 7{,}24$ nC, $Q_B = 13{,}8$ nC e $Q_C = -9{,}68$ nC sono poste nei vertici di un triangolo *ABC*, rettangolo in *B*. Il cateto *AB* misura 12,5 cm e l'angolo $B\hat{C}A$ misura 48,4°.

- ▶ Determina le componenti parallele ai due cateti delle forze esercitate da Q_A e da Q_B su Q_C.
- ▶ Determina il modulo della forza risultante che agisce su Q_C.

[$1{,}50 \times 10^{-5}$ N; $-1{,}69 \times 10^{-5}$ N; $1{,}14 \times 10^{-4}$ N]

Considero solo la forza $\vec{F}_A$ (attrattiva)



a) Trovo F_A con la legge di Coulomb

b) $F_{Ax} = F_A \cdot \cos(48{,}4°)$

c) $F_{Ay} = -F_A \cdot \sin(48{,}4°)$

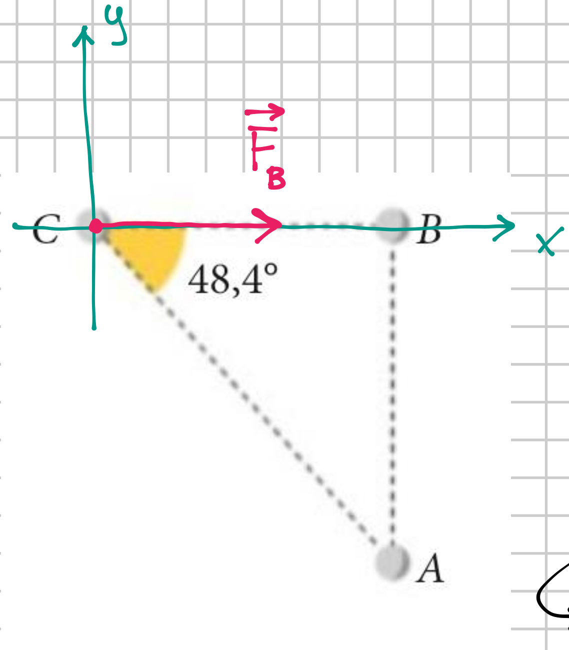
$$\overline{CA} = \frac{\overline{AB}}{\sin(48{,}4°)}$$

$$F_{Ax} = K_0 \frac{|Q_A||Q_C|}{\overline{CA}^2} \cdot \cos(48{,}4°) =$$

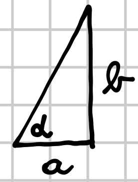
$$= \left(8{,}99 \times 10^9 \frac{N \cdot m^2}{C^2}\right)(7{,}24 \times 10^{-9}\, C)(9{,}68 \times 10^{-9}\, C) \cdot \frac{\cos(48{,}4°) \cdot \sin^2(48{,}4°)}{(12{,}5 \times 10^{-2}\, m)^2}$$

$$= 1{,}49707\ldots \times 10^{-5}\, N \simeq \boxed{1{,}50 \times 10^{-5}\, N}$$

$$F_{Ay} = -K_0 \frac{|Q_A||Q_C|}{\overline{CA}^2} \cdot \sin(48{,}4°) = -1{,}686\ldots \times 10^{-5}\, N \simeq \boxed{-1{,}69 \times 10^{-5}\, N}$$



$$\vec{F}_B = (F_B, 0)$$



$$b = a \cdot \tan\alpha$$

$$a = \frac{b}{\tan\alpha}$$

$$F_B = k_0 \frac{|Q_C||Q_B|}{\overline{CB}^2} =$$

$$\overline{CB} = \frac{\overline{AB}}{\tan 48{,}4°}$$

$$= \left(8{,}99 \times 10^9 \ \frac{N \cdot m^2}{C^2}\right) \frac{(9{,}68 \times 10^{-9}\,C)(13{,}8 \times 10^{-9}\,C)}{\dfrac{(12{,}5 \times 10^{-2}\,m)^2}{(\tan 48{,}4°)^2}} =$$

$$= 9{,}75041\ldots \times 10^{-5}\,N \simeq \boxed{9{,}75 \times 10^{-5}\,N}$$

$$\vec{F}_A = (1{,}50 \times 10^{-5}\,N \,,\, -1{,}69 \times 10^{-5}\,N) \qquad \vec{F}_B = (9{,}75 \times 10^{-5}\,N \,,\, 0\,N)$$

$$\vec{F}_{TOT_C} = \vec{F}_A + \vec{F}_B = \left((1{,}497 + 9{,}750) \times 10^{-5}\,N \,,\, -1{,}686 \times 10^{-5}\,N\right) =$$

$$= (11{,}247 \times 10^{-5}\,N \,,\, -1{,}686 \times 10^{-5}\,N)$$

$$F_{TOT_C} = \sqrt{(11{,}247)^2 + (-1{,}686)^2} \times 10^{-5}\,N = 11{,}372\ldots \times 10^{-5}\,N$$

$$\simeq \boxed{1{,}14 \times 10^{-4}\,N}$$