No. 4 maret 2024

Kelistrikan dan kemagnetan

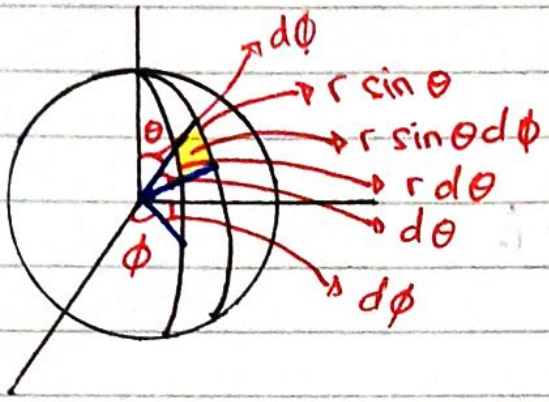
Date Senin

Koordinat Lingkaran

$\int$: kajianya mengandung partikel

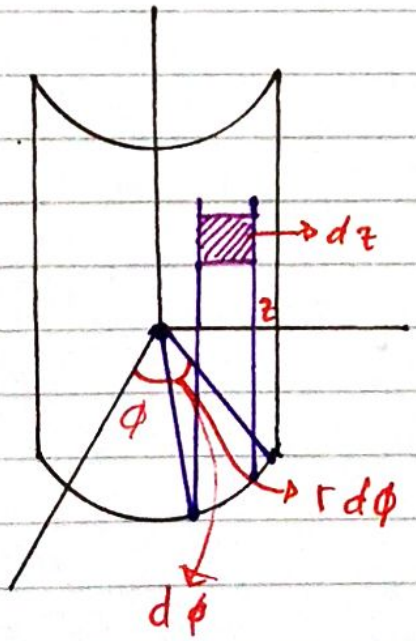
$\sin\theta = \frac{x}{r}$

$x = r\sin\theta$



$$da = d\phi \times dl$$
$$= r\,d\theta \cdot r\sin\theta\, d\phi$$
$$= r^2 \sin\theta\, d\theta\, d\phi$$
$$= r^2 \sin\theta\, d\theta\, d\phi\, dr$$

Koordinat silinder



$$A = r\,d\phi\,dz$$
$$V = r\,d\phi\,dz\,dr$$

No.

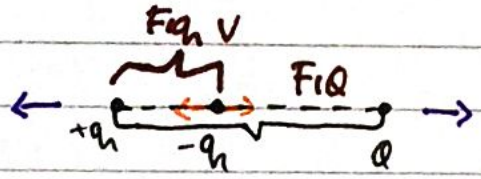
Date

medan listrik

muatan listrik : $q_n = \pm Ne$

$$\vec{F}_{q_n} = \vec{F}_Q = \vec{F} = \frac{1}{4\pi\varepsilon_0} \cdot \frac{q_n Q}{r^2} \hat{r}_0$$

$$\vec{r}_0 = \frac{\vec{r}}{|r|}$$



$+q_n (Q > q_n)$

$$F_{1q_n} = F_{1Q}$$

$$k\frac{q_n Q}{(r-x)^2} = k\frac{q_n q_n}{(x^2)}$$

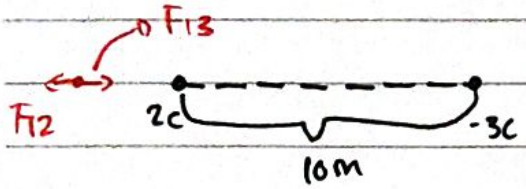
x ?

$$\frac{Q}{(r^2 - 2rx + x^2)} = \frac{q_n}{x^2}$$

$$Qx^2 = q_n (r^2 - 2rx + x^2)$$

No.

Date . .



1C.

$F_{1q_1} = F_{1Q}$

$k\frac{1.2}{x^2} = k\frac{1.3}{(10+x)^2}$

$\frac{2}{x^2} = \frac{3}{x^2+20x+100}$

$3x^2 = 2x^2 + 40x + 200$

$3x^2 - 2x^2 - 40x - 200 = 0$

$x^2 - 40x - 200 = 0$ ⇒ menggunakan rumus abc

$(x-20)(x-60)$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

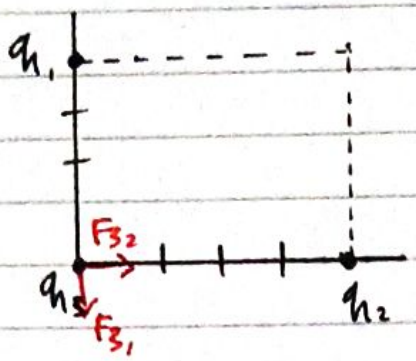
$= \frac{-40 \pm \sqrt{(-40)^2 - 4.1.-200}}{2}$

$= \frac{-40 + \sqrt{1600 + 800}}{2}$

$= -40 + \sqrt{400}$

$= -40 + 20 \quad = -40 - 20$

$= -20 \quad = -60$



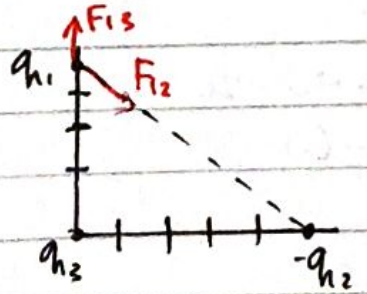
$$\vec{F}_{32} = k\frac{q_3 q_2}{q^2}\frac{(3\hat{i}+0\hat{j})}{\sqrt{3^2+0^2}}$$

$$= k\frac{q_3 q_2}{16}\hat{i}$$

$$\vec{F}_{31} = k\frac{q_3 q_1}{3^2}(-\hat{j}) = -k\frac{q_3 q_1}{9}\hat{j}$$

$$\vec{F} = kq_3\left[\frac{q_2}{16}\hat{i} - \frac{q_1}{9}\hat{j}\right]$$

$$|\vec{F}| = kq_3\sqrt{\left(\frac{q_2}{16}\right)^2 + \left(\frac{q_1}{9}\right)^2}$$



$$\vec{F}_{13} = -k\frac{q_1 q_3}{3^2}\hat{j}$$

$$\vec{F}_{12} = k\frac{q_1 q_2}{5^2}\frac{(4\hat{i}-3\hat{j})}{5}$$

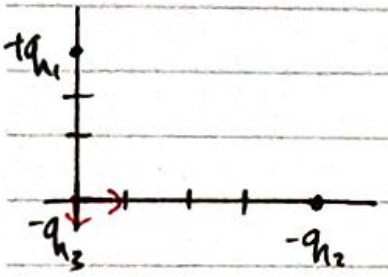
$$= 4k\frac{q_1 q_2}{125}\hat{i} - 3k\frac{q_1 q_2}{125}\hat{j}$$

$$\vec{F} = kq_1\left[\left(\frac{4q_2}{125}\right)\hat{i} + \left(\frac{q_3}{9} - \frac{3q_2}{125}\right)\hat{j}\right]$$

No.

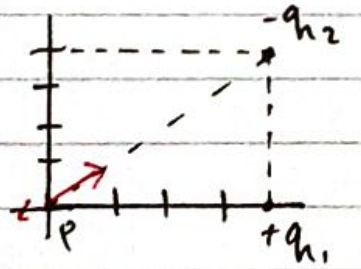
Date

Medan



$$\vec{E}_{q_3} = \frac{F_{3.2}}{q_3} = k\frac{q_3 q_2}{r} / r$$

$$F = k\frac{q_2}{r^2}\hat{i}$$



$$\vec{E}_1 = k\frac{q_1}{3^2}(-\hat{i})$$

$$= k\frac{q_1}{9}(\hat{i})$$

$$\vec{E}_2 = k\frac{q_2}{5^2}\left(\frac{3\hat{i}+4\hat{i}}{5}\right)$$

$$= 3k\frac{q_2}{125}\hat{i} + 4k\frac{q_2}{125}\hat{j}$$

$$E = k\left[\left(\frac{3q_2}{125} - \frac{q_1}{9}\right)\hat{i} + \left(\frac{4q_2}{125}\right)\hat{j}\right]$$