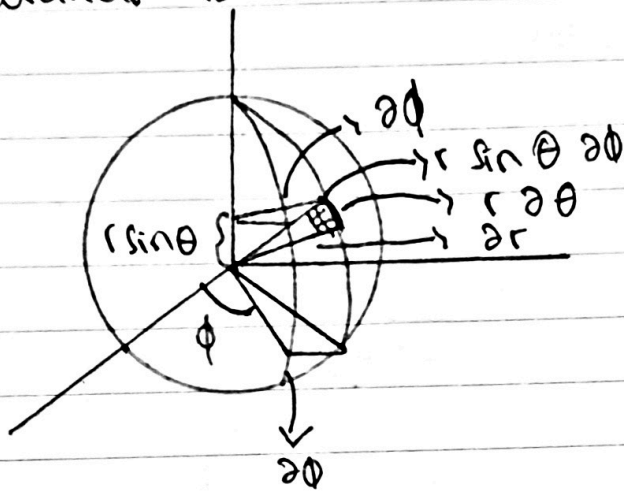


→ Koordinat Polar



$$A = l \times l$$

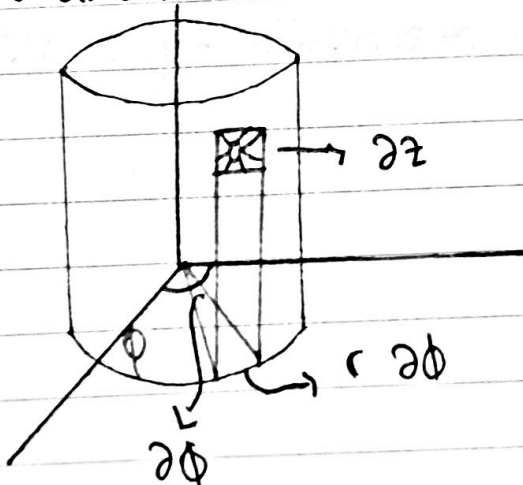
$$= r d\theta \cdot r \sin \theta \cdot d\phi$$

$$= r^2 \sin \theta d\theta d\phi$$

$$A = 4\pi r^2$$

$$V = \frac{4}{3} \pi r^3$$

→ Koordinat silinder



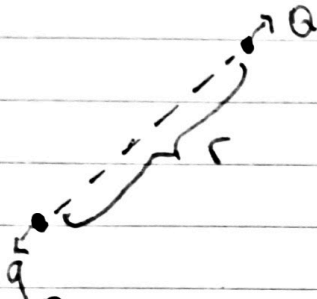
$$A = r d\phi dz$$

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

→ Listrik Statis

Contoh listrik statis yaitu petir

$$q = \pm Ne$$

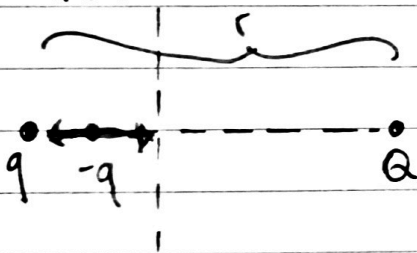


$$F = \frac{1}{4\pi\epsilon_0}$$

ϵ_0 = Permittivitas listrik

$$\epsilon_0 = \frac{q \cdot Q}{r^2} \hat{r}_0$$

Misal:



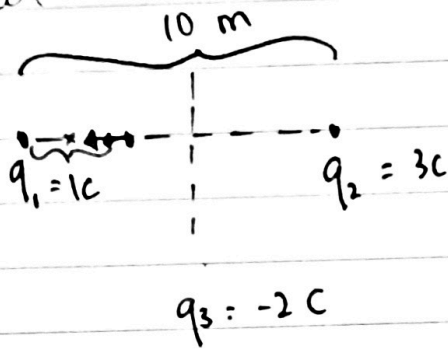
$Q > q$

Dimana letak $-q$
supaya seimbang

Diletakkan disebelah situ supaya Q menarik $-q$ sama besar dengan q menarik $-q$.

Contoh soal :

1)



$$F_1 = F_2$$

$$k \frac{q_1 q_2}{(r-x)^2} = k \frac{q_3 q_2}{x^2}$$

$$k \frac{1 \cdot 2}{(10-x)^2} = k \frac{2 \cdot 3}{x^2}$$

$$\frac{1}{x^2} = \frac{3}{(10-x)^2}$$

$$(10-x)^2 = 3x^2$$

$$100 + x^2 - 20x = 3x^2$$

$$x^2 - 3x^2 - 20x = -100$$

$$-2x^2 - 20x = -100$$

$$-2x^2 - 20x + 100 = 0$$

$$-x^2 - 10x + 50 = 0 \rightarrow \text{Menggunakan rumus abc}$$

$$x_{(1,2)} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-(-10) \pm \sqrt{(-10)^2 - 4 \cdot (-1) \cdot (50)}}{2 \cdot (-1)}$$

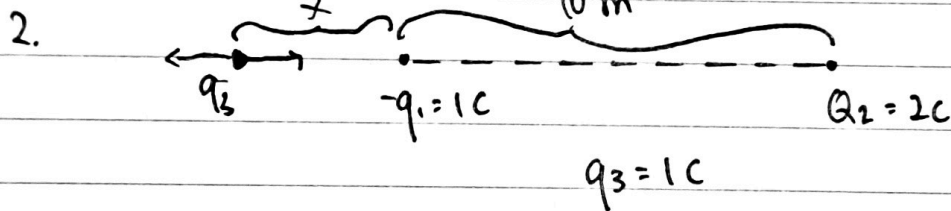
$$= 10 \pm \frac{\sqrt{100 + 200}}{(-2)}$$

$$= 10 \pm \frac{\sqrt{300}}{-2}$$

$$= 10 \pm 10\sqrt{3}$$

$$\begin{aligned}
 x_1 &= \frac{10 + 17}{2} \\
 &= \frac{27}{2} \\
 &= 13,5
 \end{aligned}$$

$$\begin{aligned}
 x_2 &= \frac{10 - 17}{2} \\
 &= \frac{-7}{2} \\
 &= -3,5
 \end{aligned}$$



q_3 terhadap q_1 tarik menarik
 q_3 terhadap q_2 tolak menolak.

Diketahui : $q_1 = 1C$
 $q_2 = 2C$
 $q_3 = 1C$

Penyelesaian :

$$F_1 = F_2$$

$$\cancel{k} \frac{q_3 \cdot q_1}{(x^2)} = \cancel{k} \frac{q_3 \cdot q_2}{(10+x)^2}$$

$$\frac{1}{x^2} = \frac{2}{(10+x)^2}$$

$$-(10+x)^2 = -2x^2$$

$$2x^2 = 100 + x^2 + 20x$$

$$2x^2 - x^2 - 20x - 100 = 0$$

$$x^2 - 20x - 100 = 0$$

$$x_{(1,2)} = \frac{-b \pm \sqrt{-b^2 - 4ac}}{2a}$$

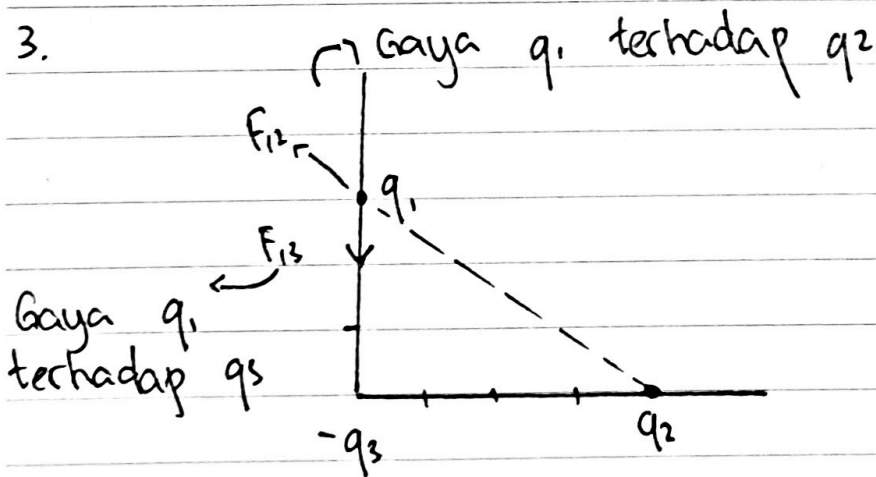
$$= \frac{-20 \pm \sqrt{(-20)^2 - (4 \cdot 1) 100}}{2}$$

$$= \frac{-20 \pm \sqrt{400 + 400}}{2}$$

$$= \frac{-20 \pm \sqrt{800}}{2}$$

$$= \frac{-20 \pm 20\sqrt{2}}{2}$$

3.



$$F_{13} = k \frac{q_1 \cdot q_3}{r^2}$$

$$= k \frac{q_1 \cdot q_3}{r^2} (-\hat{j})$$

$\hat{j}$ untuk sumbu y (-) karena kebawah.

$$F_{13} = \frac{k \cdot (0\hat{i} - 3\hat{j})}{\sqrt{0^2 + 3^2}}$$

$$F_3 = \frac{k - 3\hat{j}}{3}$$

$$F_{13} = -\hat{j}$$

$$F_{12} = k \cdot \frac{q_1 \cdot q_2}{r^2}$$

$$= k \cdot \frac{q_1 \cdot q_2}{5^2} (-4\hat{i} + 3\hat{j})$$

↑ Sumbu x
↑ Sumbu y.