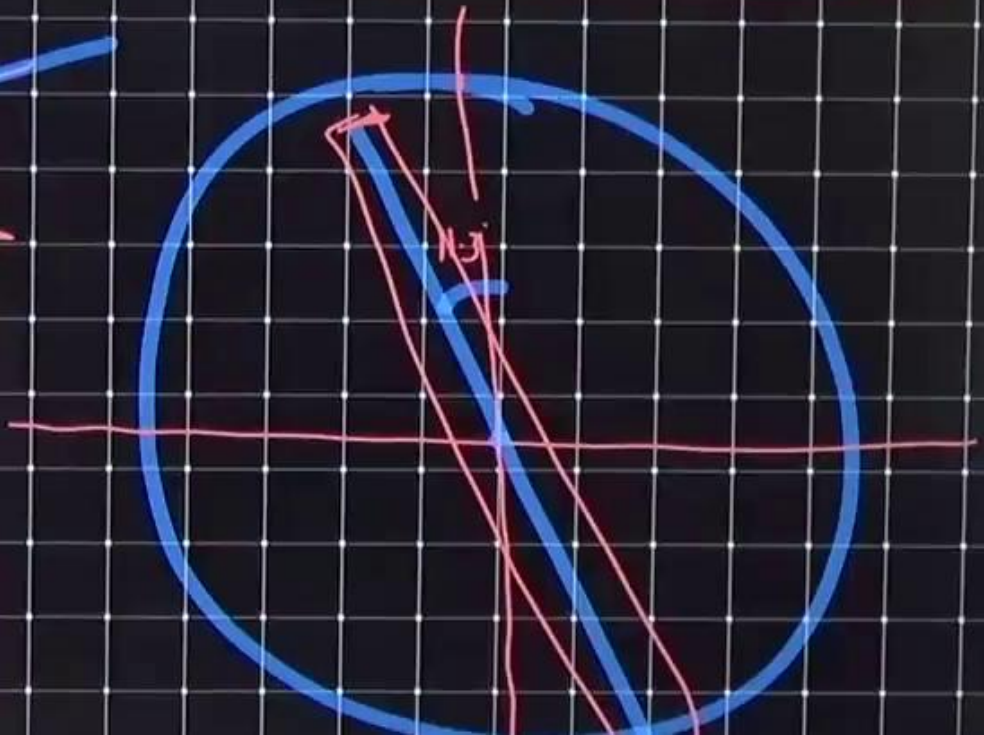
Magnetic effect of current

1200 BC

attract

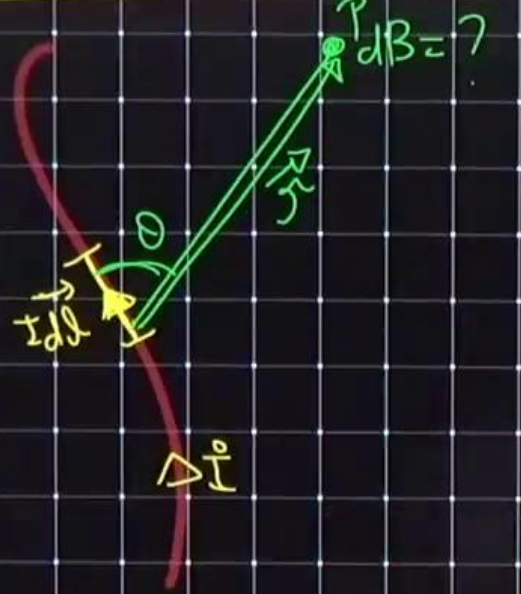
Magnetic matter



Magnetic Compass

disch of N- & S pole

Biot-Savart Experiment



$I\vec{dl}$ → Small current carrying element.

↳ P → Point where find magnetic due to small element $I\vec{dl}$

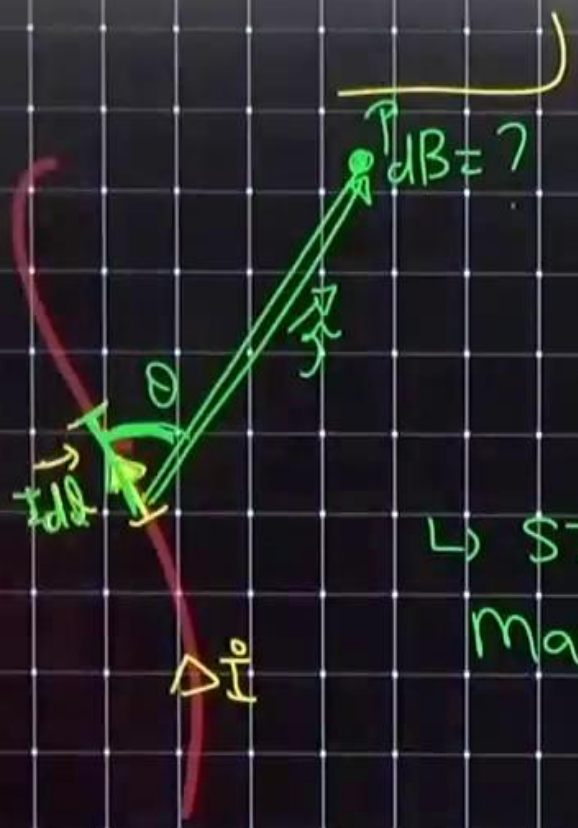
$dB \propto i\,dl\sin\theta$ ...(i)

[θ → angle b/w $i\vec{dl}$ & $\vec{r}$]

$dB \propto \frac{1}{r^2}$ ...(ii)

$dB \propto \frac{i\,dl\sin\theta}{r^2}$

$dB = \frac{\mu_0}{4\pi}\frac{i\,dl\sin\theta}{r^2}$



$$dB = \frac{\mu_0}{4\pi} \frac{i\,dl\sin\theta}{r^2}$$

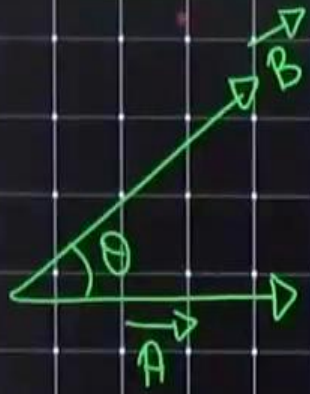
$\frac{\mu_0}{4\pi}$ = Constant

$$\frac{\mu_0}{4\pi} = 10^{-7}\ \frac{T\text{-}m}{Amp}$$

↳ SI Unit of Magnetic field B → Tesla

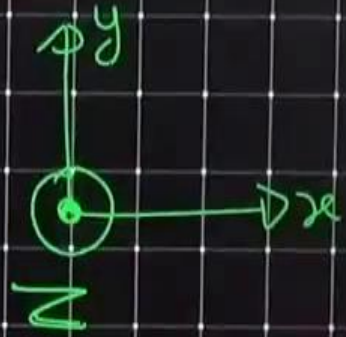
μ_0 = Permiability of free space

Cross-vector / Vector product



$$\vec{A} \times \vec{B} = |\vec{A}||\vec{B}| \sin\theta \, \hat{n}$$

$$= AB \sin\theta \cdot \hat{n}$$



$\hat{n} \rightarrow$ direction

How to find direction of $\vec{A} \times \vec{B}$: Use Right hand thumb rule