ДЗ8

1. Дано: R | Найти магнитное поле

$$dB = \frac{\mu\mu_0 I}{4\pi}\frac{R}{x^2}\cdot\frac{dl\sin\alpha}{r^2} = \frac{\mu\mu_0 I}{4\pi}\cdot\frac{\sin\alpha\cdot R\,d\alpha}{\left(\frac{R}{\sin\alpha}\right)^2\sin^2\alpha} = \frac{\mu\mu_0 I}{4\pi}\cdot\frac{\sin\alpha}{R}d\alpha$$

№2) бесконечного проводчика
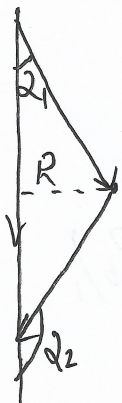
$$B = \int_0^\pi \frac{\mu\mu_0 I}{4\pi}\cdot\frac{\sin\alpha}{R}d\alpha = -\frac{\mu\mu_0 I}{4\pi R}\cos\alpha\Big|_0^\pi = \frac{\mu\mu_0 I}{2\pi R}$$
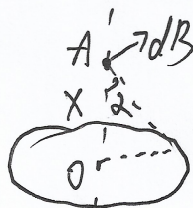
б) для отрезка проводчика

$$B = \int_{\alpha_1}^{\alpha_2}\frac{\mu\mu_0 I}{4\pi}\cdot\frac{\sin\alpha}{R}d\alpha = -\frac{\mu\mu_0 I}{4\pi R}\cos\alpha\Big|_{\alpha_1}^{\alpha_2} = \frac{\mu\mu_0 I}{4\pi R}\left(\cos\alpha_1 - \cos\alpha_2\right)$$

№2. 2) Дано: R, центр витка

$$B - ?$$

$$B = \int_0^{2\pi R}\frac{\mu\mu_0 I}{4\pi}\cdot\frac{dl}{R^2}$$

$$= \frac{\mu\mu_0 I}{2R}$$

б) Дано: {магнитное поле в A

$$dB = \frac{\mu\mu_0 I}{4\pi}\cdot\frac{dl\cdot\overset{\sin\alpha}{\cos\alpha}}{R^2+x^2} = \frac{\mu\mu_0 I}{4\pi}\cdot\frac{R}{\sqrt{R^2+x^2}}\cdot\frac{dl}{R^2+x^2}$$

$$B = \int_0^{2\pi R}\frac{\mu\mu_0 I}{4\pi}\frac{R}{(R^2+x^2)^{\frac{3}{2}}}dl = \frac{\mu\mu_0 I R^2}{2(R^2+x^2)^{\frac{3}{2}}}$$