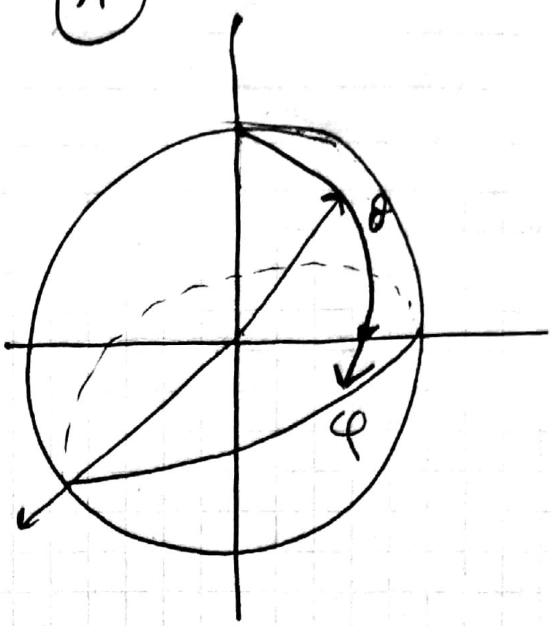
① A

$$\delta_\bullet = \int_\nu \int_\Omega B \, d\Omega \, d\nu \qquad \cos\theta$$

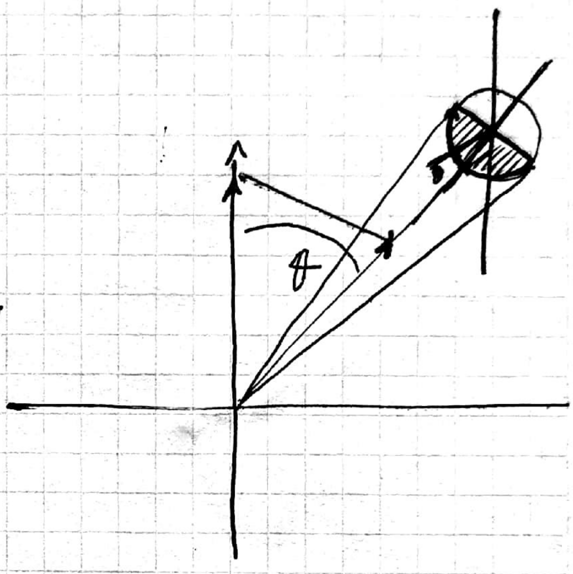


$$\frac{Area}{R^2} = \cancel{R^2} \int_0^{2\pi} \int_0^{\pi/2} \cos\theta \, sen\theta \, d\theta \, d\varphi$$

$$= 2\pi \cancel{R^2} \int_0^{\pi} \frac{1}{2} sen(2\theta) \, d\theta$$

$$= 2\pi \cancel{R^2} \int \frac{1}{2} \frac{1}{2} sen(2\theta) \, 2d\theta$$

$$= 2\pi \cancel{R^2} \frac{1}{4} \int_0^{\pi} sen(2\theta) \, d(2\theta)$$



$$= \frac{2\pi \cancel{R^2}}{4} \int_0^{\pi} sen\, x \, dx$$

$$= \frac{2\pi \cancel{R^2}}{4} \left[-\cos x \Big|_0^{\pi} \right]$$

$$= \frac{\pi}{2} \cancel{R^2} \left[-(\cos\pi - \cos 0) \right]$$

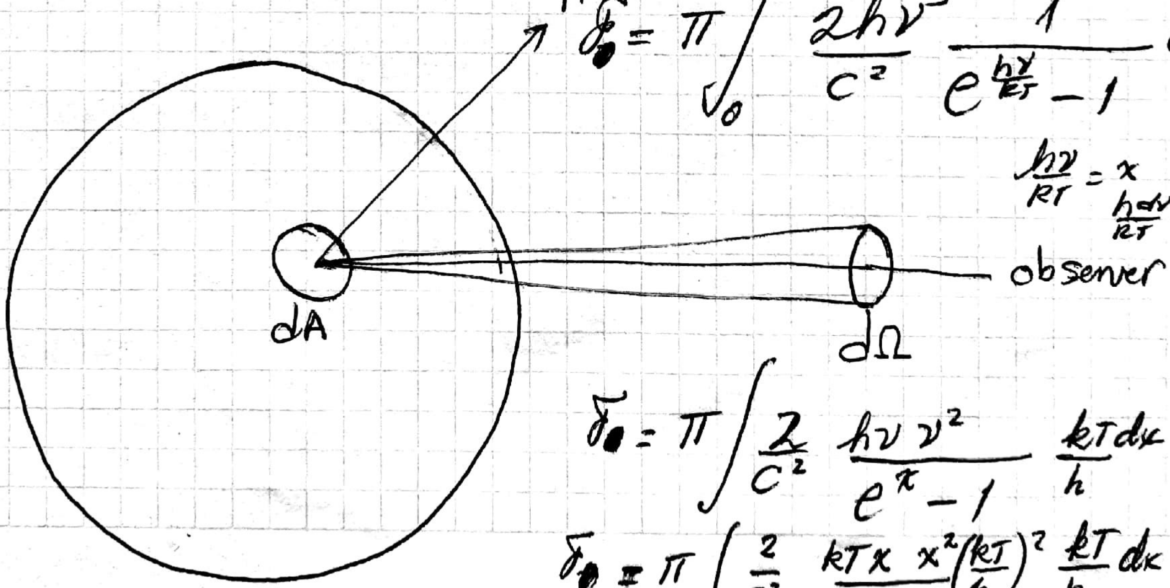
$$= \frac{\pi}{2} \cancel{R^2} \left[-(-1 - 1) \right]$$

$$= \frac{\pi}{2} \cancel{R^2} \left[-(-2) \right]$$

$$\frac{Area}{R^2} = \pi \cancel{R^2} \quad \text{Angulo Sólido}$$

$$\delta_\bullet = \pi \int_0^{\infty} \frac{2h\nu^3}{c^2} \frac{1}{e^{\frac{h\nu}{kT}} - 1} \, d\nu$$

$$\frac{h\nu}{kT} = x \qquad \frac{h\,d\nu}{kT} = dx$$



$$\delta_\bullet = \pi \int \frac{2}{c^2} \frac{h\nu\,\nu^2}{e^x - 1} \frac{kT\,dx}{h}$$

$$\delta_\bullet = \pi \int \frac{2}{c^2} \frac{kTx \; x^2 \left(\frac{kT}{h}\right)^2}{e^x - 1} \frac{kT}{h} \, dx$$

②

$$\mathcal{F}_\nu = \pi \frac{2}{c^2} \frac{(kT)^4}{h^3} \int_0^\infty \frac{x^3}{e^x - 1}\, dx$$

$$\cancel{\int u\, dv = uv - \int v\, du}$$

$$\cancel{u = \frac{1}{e^x - 1} \qquad dv = x^3 dx \qquad v = \frac{1}{4} x^4}$$

$$\cancel{u = (e^x - 1)^{-1} \qquad du =}$$

$$dv = \frac{dx}{(e^x - 1)}$$

$$u = x^3$$

$$du = 3x^2 dx$$

$$v = \ln(e^x - 1)$$

$$\ln(e^x - 1)\, x^3 \Big|_0^\infty - \int \ln(e^x - 1)\, 3x^2 dx$$

$$\int_0^\infty \frac{x^3}{e^x - 1}\, dx = \frac{\pi^4}{15}$$

$$\boxed{\mathcal{F} = \frac{\pi^5 2 k^4}{15 c^2 h^3} T^4}$$

$$\sigma = \frac{2\pi^5 k^4}{15 c^2 h^3} \quad \text{Stefan-Boltzmann constant}$$

$$\boxed{\sigma = 5.669 \times 10^{-5} \frac{erg}{cm^2} \frac{1}{(^\circ K)^4} \frac{1}{s}}$$

$$\mathcal{F} = \sigma T^4$$

$$\boxed{\mathcal{F} \text{ tiene unidades de } \frac{erg}{cm^2\, s}}$$

$$L = \underbrace{4\pi R^2}_{cm^2} \underbrace{(\sigma T^4)}_{\frac{erg}{cm^2\, s}}$$

$$\boxed{L_* = 4\pi R^2 \sigma T^4} \quad \frac{erg}{s}$$

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$$\mathcal{F} = \int_0^{\Omega_{estrella}} \mathcal{F}_\Omega \, d\Omega \quad \text{—— (1)}$$

$$= \pi \mathcal{F}_\Omega \quad \text{—— (2)}$$

$$= \pi \left(\frac{2k^4 \pi^4}{15c^2h^3} \right) T^4 \quad \text{—— (3)}$$

$$\mathcal{F} = \underbrace{\left(\frac{2k^4}{15h^3c^2} \pi^5 \right)}_{\text{Constante de Stefan Boltzman.} \equiv \sigma} T^4 \quad \text{—— (4)}$$

—— (5)

$$\boxed{\mathcal{F} = \sigma T^4} \quad \frac{ergs}{s\,cm^2} \quad \text{—— (6)}$$

depende solamente de T !!

$$\sigma = 5.6704 \times 10^{-8} \, W m^{-2} K^{-4}$$

$1W = 10^7 \frac{ergs}{s}$

$1m^2 = 10^4 \, cm^2$

$$= 5.6704 \times 10^{-8} \, 10^7 \frac{erg}{s} \times \frac{1m^2}{10^4 cm^2}$$

$$\sigma = 5.6704 \times 10^{-5} \, \frac{ergs}{s} \frac{1}{cm^2} \frac{1}{(°K)^4}$$