Our universe is filled with black body radiation at a temperature of T= 3 K. This radiation is thought to be a relic from the "big bang" now filling the continuously expanding and cooling universe. Answer the following questions:

a. Express the photon number density analytically in terms of T, universal constants and numerical cofactors.
b. Now determine n numerically in terms of photons/cm^3.

(Hint: The Bose-Einstein distribution for photons is given by $\frac{1}{e^{\beta\hbar\omega}-1}$, the integral $\int_0^\infty \frac{x^2 dx}{e^x - 1} \simeq 2.4$, and $d^3\boldsymbol{n} = \frac{V}{(2\pi)^3}\, d^3\boldsymbol{k}$)