2) Start with

$$B_\lambda = \frac{2hc^2\lambda^{-5}}{\exp\left(\frac{hc}{k_B\lambda T}\right)-1}$$

and change variables to $n = 1/\lambda$
and show that

$$B_n = \frac{2hc^2 n^3}{\exp\left(\frac{hc}{k_B T}\right)-1}$$

Step 1: want $B_n\, dn = B_\lambda\, d\lambda$

so $B_n = B_\lambda \frac{d\lambda}{dn}$

$\lambda = n^{-1}$ $\quad \frac{d\lambda}{dn} = -n^{-2}$

$$B_n = \frac{2hc^2 n^5}{\exp\left(\frac{hc}{k_B T} n\right)-1}\left(-n^{-2}\right)$$

$$= -\frac{2hc^2 n^3}{\exp\left(\frac{hcn}{k_B T}\right)-1}$$

Why do we have a minus sign?

Consider the definite intergral from $\lambda_1 \rightarrow \lambda_2$ where $\lambda_2 > \lambda_1$

$$\int_{\lambda_1}^{\lambda_2} B_\lambda \, d\lambda = \int_{n_1}^{n_2} B_n \, dn = -\int_{n_1}^{n_2} \frac{c_1 n^3}{\exp(c_2 n) - 1} \, dn$$

but $n_1 = 1/\lambda_1$, $n_2 = 1/\lambda_2$

and $n_1 > n_2$ so we're going ~~to~~ from larger to smaller n flip the limits by multiplying by -1 :

$$\int_{\lambda_1}^{\lambda_2} B_\lambda \, d\lambda = \int_{n_2}^{n_1} B_n \, dn$$

$d\lambda > 0$ $\qquad$ $dn > 0$