$$I(\omega) = \frac{\hbar}{4\pi^2 c^2} \frac{\omega^3}{e^{\hbar\omega/k_B T} - 1}$$

$$W = I(\omega)\, d\omega$$

$$= \frac{\hbar}{4\pi^2 c^2} \int_0^\infty \frac{\omega^3}{e^{\hbar\omega/k_B T} - 1}\, d\omega$$

$$\frac{\hbar\omega}{k_B T} = x \qquad d\omega = \frac{k_B T}{\hbar}\, dx$$

$$W = \frac{\hbar}{4\pi^2 c^2} \left(\frac{k_B T}{\hbar}\right)^3 \cdot \frac{k_B T}{\hbar} \int_0^\infty \frac{x^3}{e^x - 1}\, dx$$

$$W = \frac{k_B^4 T^4}{4\pi^2 c^2 \hbar^3} \int_0^\infty \frac{x^3}{e^x - 1}\, dx$$