1) In Lecture 24, we derived a general expression for the electron-phonon scattering rate as:

\[
\frac{1}{\tau} = \frac{1}{4\pi^2} \int_{\beta_{\text{max}}}^{\beta_{\text{min}}} C_{\beta} \left( N_\omega + \frac{1}{2} \mp \frac{1}{2} \right) \beta^2 d\beta
\]

Repeat the derivation and derive the corresponding expression for two dimensional electrons. You may assume parabolic energy bands and that \( C_{\beta} \) for 2D electrons is given.