[tex111] Density of energy levels for ideal quantum gas

Consider a nonrelativistic ideal quantum gas in $\mathcal{D}$ dimensions and confined to a box of volume $V = L^{\mathcal{D}}$ with rigid walls. Show that the density of energy levels is

$$D(\epsilon) = \frac{L^{\mathcal{D}}}{\Gamma(\mathcal{D}/2)} \left(\frac{m}{2\pi\hbar^2}\right)^{\mathcal{D}/2} \epsilon^{\mathcal{D}/2-1}.$$

Solution: