	Microcanonical ensemble	Canonical ensemble	Grand canonical ensemble
density (unrenormalized)	$\rho(p,q) = \delta(E - \mathcal{H}(p,q))$	$\rho(p,q) = e^{-\beta\mathcal{H}(p,q)}$	$\rho(p,q) = e^{-\beta(\mathcal{H}(p,q)-\mu N)}$ $= z^N e^{-\beta\mathcal{H}(p,q)}$
partition function	$Z_{\mathrm{m'can}} = \Lambda_N \int dpdq\ \rho(p,q)$ $= \omega(E)$	$Z_N = \Lambda_N \int dpdq\ \rho(p,q)$ $= \Lambda_N \int dpdq\ e^{-\beta\mathcal{H}(p,q)}$	$\mathcal{Z} = \sum_{N=0}^{\infty} \Lambda_N \int dpdq\ \rho(p,q,N)$ $= \sum_{N=0}^{\infty} z^N Z_N$
average value	$\langle A \rangle = \frac{\Lambda_N}{\omega(E)} \int dpdq\ \rho(p,q)A(p,q)$	$\langle A \rangle = \frac{\Lambda_N}{Z_N} \int dpdq\ \rho(p,q)A(p,q)$	$\langle A \rangle = \sum_{N=0}^{\infty} \frac{\Lambda_N}{\mathcal{Z}} \int dpdq\ \rho(p,q,N)A(p,q,N)$
thermodyn. potential	$S(E,V,N) = k_B \log \omega(E,V,N)$	$F(T,V,N) = -k_B T \log Z_N(T,V)$	$\Omega(T,V,\mu) = -k_B T \log \mathcal{Z}(T,V,\mu)$