## Worksheet \#19

(Monday, November 20, 2023)

## Name

## Questions (5 pts):

Consider the Schroedinger equation for a 1D harmonic oscillator. Without solving the equation, try to extract as much information about allowed energies and corresponding wavefunctions as you can. In particular,

1) Is the energy spectrum continuous or discrete? What happens at $\mathrm{E}<0$ ?
2) Using symmetry arguments, sketch wavefunctions for the three lowest-energy states
3) Estimate an expectation value of the position operator $X$ in an arbitrary state described by $\psi_{\mathrm{n}}(\mathrm{x})$.
