

7.4: Problems

1. Consider a particle of mass m in a box defined between $x = 0$ and $x = a$, that is prepared in the $n = 1$ state. If the wavefunction is approximated by

$$\psi(x) = \sqrt{\frac{30}{a^5}} x(a-x)$$

- Show that the expectation value of $\langle E \rangle$ exceeds E_1 for a particle in a box.
 - By what percentage does the approximate energy exceed that of the $n = 1$ energy?
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