

- (1) Two different wave functions, $\psi_1(x)$ and $\psi_2(x)$, are shown below. Consider the following four combinations of states:

(a) $\psi_1(x)$ (b) $\psi_2(x)$ (c) $\psi_1(x) + \psi_2(x)$ (d) $\psi_1(x) + i\psi_2(x)$

Assume each state (or combination of states) is properly normalized.

- (a) Rank the states, from lowest to highest, based on the expectation value of x for each state.

Smallest value of $\langle x \rangle$ _____ _____ _____ _____ Largest value of $\langle x \rangle$

- (b) Rank the states, from lowest to highest, based on the uncertainty in x for each state.

Smallest value of Δx _____ _____ _____ _____ Largest value of Δx

