Chem. 540
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PROBLEM BASICS 1

Consider the following wavefunctions that describe two states in one dimension:

$$\Psi_1(x) = a\, e^{-m\omega x^2/2\hbar}, \quad \Psi_2(x) = b\, x\, e^{-m\omega x^2/2\hbar}$$

Here m and ω are constants that have units of mass and inverse time, respectively, and a, b are normalization constants.

(a) Normalize the wavefunctions, i.e., calculate a, b.
(b) Calculate the overlap of these two functions.