

Chem. 540  
Instructor: Nancy Makri

### PROBLEM BASICS 3

Consider the wavefunction

$$\Psi_2(x) = b \cos\left(\frac{2\pi x}{L} - \frac{1}{2}\pi\right),$$

again for a particle constrained to move along the  $x$  axis between the coordinates 0 and  $L$ .

(a) Determine the normalization constant  $b$ . (You may reuse any results from problem Basics 1.)

Next, suppose we place this particle in the superposition state described by the following wavefunction:

$$\Psi(x) = N(\Psi_1(x) + \Psi_2(x)).$$

(b) Calculate the normalization constant  $N$ . Try to reuse what you already know, to avoid evaluating more than one integral.