

**Problem W10:**

The wave function for a particle in the ground state of an infinite square well is

$$\psi(x) = \sqrt{\frac{2}{L}} \sin \frac{\pi}{L} x.$$

Find the following quantities for a particle of mass  $m$  in this state:

- (a)  $\langle x \rangle$ ;
- (b)  $\langle x^2 \rangle$ ;
- (c)  $\langle p \rangle$ ;
- (d)  $\langle p^2 \rangle$ ;
- (e) the uncertainty product  $\Delta p \Delta x$  (see Eq. (6.34)).